RAILROAD GAZETTE

FRIDAY, AUGUST 15.

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Contributions.

Radial Stay Boilers.

Aug. 6, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to your article in last issue, "The Belpaire and the Radial Stay Boiler:" In the radial stayed boiler you illustrate, I notice that the longitudinal seams in the shell are apparently of the sextuple riveted, butt type, having a strength of probably 82 per cent. of the solid plate, while the longitudinal seams in the throat sheet and the dome flange are only a double riveted lap, the strength of which cannot exceed 66 per cent. of the solid plate. These two points being under any circumstances the weakest in the boiler, why is it necessary to make the other longitudinal seams exceed the strength of these points over 25 per cent.; or, in other words, why should the two weakest points in the boiler be made over 20 per cent. weaker than the longitudinal seams?

Another point: Why is the longitudinal seam uniting the wagon top and the side sheets only single riveted? This seam must sooner or later leak badly on account of the excessive strains set up by the distortion of the shape of the boiler at this place due to taking up the expansion of the inside fire box sheets, not provided for by the radial stays. Would some of your readers kindly enlighten us regarding what becomes of the excess of expansion of inside fire box sheets over the casing or outside fire box; and, assuming that the strains on all the stay bolts are uniform when the boiler is cold, what these strains are in a boiler of the size you illustrate when developing 600 H. P. at 180 lbs. pressure? Also why, in a radial stayed boiler even of small size, the flue sheets develop cracks at the root of the flange or through rivet holes, either in the centre of the crown or else on the sides about the centre line of the boiler, or both? And why a radial stayed boiler generally leaks more around the mud ring than a well-braced crown bar boiler? Also why the throat sheet seams in a radial stay boiler are apt to give more trouble than in a crown bar boiler? A crown bar boiler can be built with ample room underneath the bars to provide for washing off the dirt deposited by the very worst kind of water. A radial stayed boiler, however, is somewhat lighter than a crown bar boiler of the same heating surface.

The railroad mechanical world at large would be interested in a fair comparative statement of the merits (?) of a radial stayed wagon top boiler over a thoroughly well constructed boiler of the crown bar wagon top type aside from its cheapness in first cost. I trust that some of the advocates of this form of steam generator will give us a statement of its advantages (?) over a first class *locomotive boiler* of either the crown bar wagon top or Belpaire type. LOCOMOTIVE.

The New York Central Strike.

At 7 o'clock on Friday night, Aug. 8, about 1,000 employés of the New York Central & Hudson River road suddenly left their work, bringing both passenger and freight traffic to a standstill on considerable portions of the road, and causing great inconvenience and delay throughout the line. The company in discharging about 60 men on account of lack of business, a week or so before, had selected for dismissal certain men who had threatened to "squeeze" the company when they got a chance, and the Knights of Labor, to which order these men belonged, had asked for their reinstatement, alleging that the men had been discharged because of their membership in the order. This demand was refused and the strike was, after some appealing, ordered. It was arranged with perfect secrecy, so that all the officers seem to have been ignorant of the strikers' intentions three hours before they stopped work, and most of those at New York City had gone home at the hour when the disturbance began.

The worst interruption of traffic was the stoppage of passenger trains at and near the Grand Central Station in New York. Most or all of the yardmen, a number of passenger brakemen and a few of the men in the interlocking tower were among the strikers, and trains were abandoned in the yard and for several miles out. Trains were held at each of the block stations in the tunnel below 100th street, and large numbers of passengers had to make their way out on foot as best they could. Freight trains were abandoned at Sixtieth street, on the west side of New York City and at Albany, Syracuse and at other points along the line. The number of strikers west of Rochester was insignificant, and the number in the passenger department at Albany and west of there seems to have been proportionately much smaller than at New York, and trains, although very badly delayed, were not so completely blocked as at New York. The New York, New Haven & Hartford road, which uses 12 miles of the Harlem Division, was badly disturbed, a number of trains having to be omitted because of the blockade between Forty-second street and Mott Haven, and the lack of men for switching in New York. A number of milk trains on the Harlem Division were abandoned at Dover Plains, and the milk supply of New York City was materially curtailed for one day. Although the strikers apparently were very careful not to directly interfere with mail trains, the mails were nevertheless very badly delayed.

Among the strikers were some station employés, freight handlers at the large freight stations in New York City, and employés on the lighters carrying freight in New York harbor. Among those whose discharge caused the strike were firemen, car examiners, car cleaners, train baggagemasters and brakemen, passenger station employes and shopmen. In New York City the company at once secured ample police protection for its yards and property, and the road was lined with policemen for miles up to Tuesday night and is still well guarded. A few strikers tried to take possession of one of the interlocking towers near the Grand Central Station but were repulsed by the police. Some of the trains running through Eleventh avenue were stoned on Monday, but aside from this no violence was reported in New York. A milk train was forcibly detained at Dover Plains. At Syracuse, on Sunday, the strikers interfered with passenger trainmen and prevented the runnng of some trains, though there seems to have been no sharp conflict. Trains which met with any difficulty were transferred to the West Shore road, on which there was no disturbance, except a small strike of yardmen at Weehawken on Saturday night, which amounted to nothing. An attempt was made Tuesday night to wreck an express train at Sing Sing by winding a large chain around the rail. On Wednesday night, at the West Albany freight yards, some Pinkerton men, fearing a band of strikers intended to stone passing trains, attempted to dislodge them from a bridge, but had a little fight in doing it. At Schenectady, on Wednesday, the strikers by pulling the coupling pins and by placing a nut inside the left guide-bar of a locomotive temporarily defeated an attempt to move a freight train. There was a small sympathetic strike on the Delaware & Hudson at Albany Wednesday of this week, detaining some freight trains a few hours. As a result of the freight blockade on the New York Central, an emergency order for boxes to the National Packing Box Manufacturing Co., Brooklyn, caused a strike of 80 out of 110 employés of the shop, who struck from sympathy for the New York Central men.

Vice-President C. C. Clark, who is acting as president during the absence of President Depew in Europe, sent a formal demand to the municipal authorities along the line for police protection, and after the disturbance at Syracuse on Sunday a demand was made upon the Governor of the state for protection under the special act. Three companies of militia were assembled at Syracuse, but it appears that order was finally restored without their assistance. The company employed Pinkerton detectives on the Harlem division and at Albany and west of there. At New York the new men were quartered in dining cars to keep them out of the reach of strikers.

The trains detained by the trouble in the Grand Central Depot yard were finally got out of the way about 4 o'clock Saturday morning, and during Saturday forenoon the company sent out its most important trains, and during the afternoon nearly all of that class. The New Haven road did the same, but on both lines a number of the short-trip passenger trains were abandoned. The New Haven road sent a number of its trains to and from the Harlem River terminus of its own road. On Sunday practically all of the through trains were resumed, but the locals were omitted, and the through trains were detained by the disturbances at Syracuse, as noted above. On Monday the passenger service was completely restored, except half a dozen local passenger trains between New York and Croton, and through freight was resumed on a small scale. The officers gave the reporters hopeful accounts, as indeed they had done since Saturday, but freight seemed, from the details given out, to be moving with great difficulty even as late as Wednesday.

The severity of the first blockade and the annoying detentions that continued for several days at New York were largely owing to the cramped condition of the Grand Central yard, which even under normal circumstances, necessitates the constant employment of brakemen and switch tenders who have the most perfect familiarity with the yard. The interlocking tower is worked by five men from 7 to 3 and five from 3 to 11. Only the latter struck and they were compromised with on Monday, else the difficulty would probably have been even worse.

Immediately on the occurrence of the strike the company commenced hiring new men, large numbers of applicants presenting themselves. A portion of the strikers, probably one-half, repented and returned to work before Saturday night, but the number of new men was so large that passenger trains were handled only with considerable delay at New York.

As is well known, President Depew is noted for his conciliatory ways in dealing with his employés, as well as every one else, and the strikers cabled an appeal to him in Europe. They also started a report, after the outbreak, that he would have to come home, but it does not appear that they moved him.

The final interview that precipitated the strike is reported as follows:

MR. WEBB (Vice-President of the road): Well, what is it, Mr. Holland?

MR. HOLLAND: I wish to have an interview with you in reference to the disturbances between the company and its men.

MR. WEBB: Have you any connection with the company in any way?

MR. HOLLAND: No; I represent the Knights of Labor.

MR. WEBB: I do not know that we have any trouble on hand with outsiders. I deny the right of outsiders to interfere in any matter between the company and its men.

MR. HOLLAND: Then you deny me an interview?

MR. WEBB: I deny you an interview if you propose to discuss any trouble between the company and its employés.

Mr. Holland then retired.

A Roman Catholic priest and a member of the State Board of Arbitration appealed to Mr. Webb after the strike, but he had discharged the strikers and had nothing to arbitrate.

158-foot Arch Bridge Wheeling, W. Va.

In former issues we have announced the letting to Messrs. Paige, Carey & Co., of New York, of the contract for building a stone arch bridge over Wheeling Creek, Wheeling, W. Va. The contract price is $109,583.50, and the bridge is to be completed Dec. 1, 1890. The bridge is a roadway bridge, and will carry an electric railroad track also.

Trolley Pole and Lamp Post—Wheeling Arch

The illustrations herewith are from the designs of Mr. F. L. Hoge, City Engineer, and Walter P. Rice, Consulting Engineer. The following description is condensed from the specifications.

Dimensions.—The bridge will be a segmental arch of 158 ft. span at the springing lines; 28 ft. rise; radius of the intrados, $125\frac{446}{1000}$ ft; depth of key, 4½ ft.; depth of springers, 6 feet; depth of abutments from springs to foundations about 27 feet; width at base, 38 ft.; width at springs, 29 ft. The lengths of wings are as follows: N. E. wing, 72 ft; N. W. wing, 42 ft; S. E. wing, 41 feet; S. W. wing 27 feet.

The length of the east parapet is 329 ft., of the west parapet, 285 ft. The roadway from curb to curb is 30 ft.; sidewalks in clear, 7½ ft. height of parapet from sidewalk to top of coping, 4 ft.; grades of roadway on bridge, 4 per cent.

Excavation.—The rock bottom for the abutment foundations will be scabbled and leveled off, preparatory to placing the footing courses, and all refilling will be done in layers not exceeding 12 in. and rammed. The layers against the wings will be inclined to the same, being highest against the wall. The price bid for masonry covers all expenses for coffer dams, protection to foundation pits from caving, and all risks from high water or otherwise.

Masonry.—The stone in abutments shall be laid on their natural quarry beds, in regular courses, of not less than 24 in. The inclined courses shall decrease regularly from top to bottom of the work.

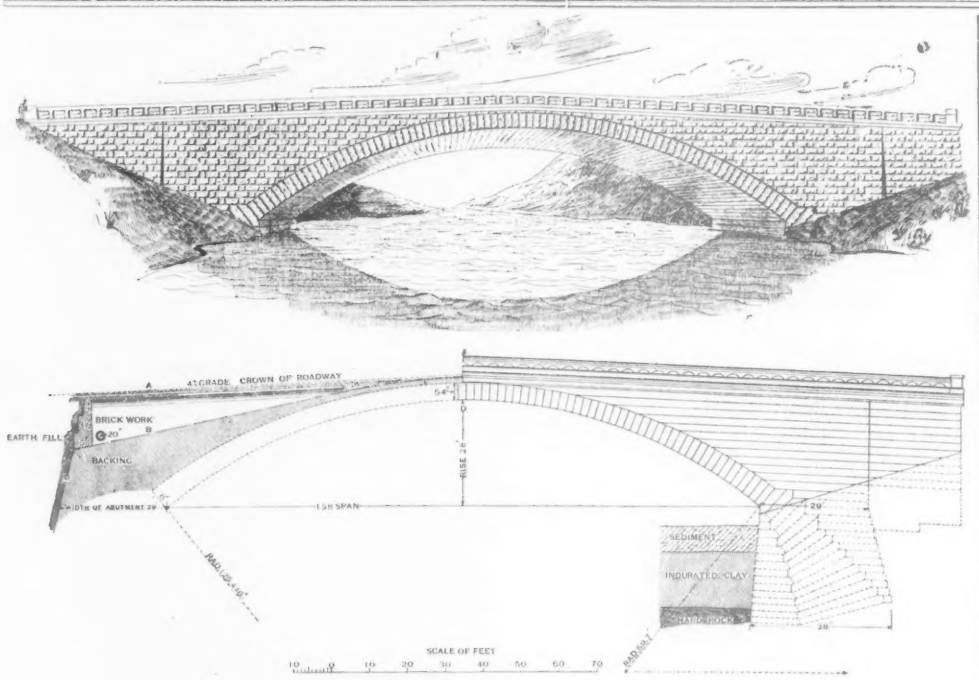
The stretchers must have a length of not less than twice nor more than 3½ times their depth, and widths not less than 1¼ times their depth. Headers shall have a length not less than 2¼ nor more than 3½ times their depth, and width not less than depth, and must hold the size in the heart of the wall which they show on face. All stone must be cut before being placed on work, so that the beds and vertical joints shall not exceed ¾ in., the vertical joints extending in not less than ⅓ the width of the stone from the face, and as much more as the stone will admit of. The vertical joints in face and back of inclined courses shall be cut to same width as the bed. The masonry shall consist of headers and stretchers, and every header shall be immediately over a stretcher in the course below, so arranged that a header in a superior course shall be placed between two headers in the course below; no header shall be laid over a joint, and no joint shall occur over a header; a bond less than 1 ft. will in no case be allowed.

The backing shall be of good sized, well-shaped stones, laid so as to break joints and thoroughly bond the work in all directions, and leave no spaces between the stones more than 6 in. in width, the voids being filled in with small stone and spalls thoroughly embedded in cement mortar.

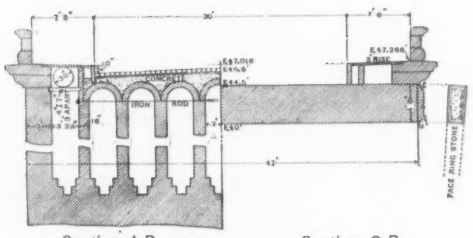
Such courses in the abutments, as the engineer may direct, may be projected not more than 12 in. beyond the face, on which to rest the arch centering, and shall be cut off to conform to the batir of the face, when the work is completed, if so required. The first four inclined courses below the skew backs must have special attention.

Wings.—The upper courses of the wings will be carried up so that the top of the walls shall have a 4 per cent. slope on which to start the parapet walls. Weep holes will be placed in such proportion to the walls as the engineer may direct.

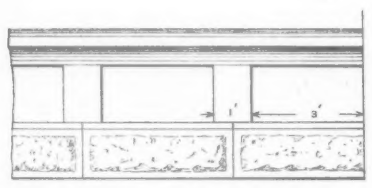
The Arch.—No stone shall be less than three feet in length. The ringstones will be finished with a rock face, and 2-in. bevel. The beds of the arch stones shall be dressed to conform to the radius of the arch, and must be cut to a pattern that will be furnished by the engineer; they must be true and straight and worked to a ¼-inch joint throughout the whole bed. No slackness at the back will be permitted. The heading joints to be at right angles to the beds and cut to ⅝ of an inch joints. The intrados of each stone to be a true segment of the circle that forms the arch and will be pointed off smooth throughout the face. The arch and ringstones must be set with a lewis, and have a full bed of cement mortar, and be settled to place with a heavy wooden maul. The backs of all arch stones must be scabbled off to conform to the curve of the extrados before being set. The back of arch shall receive a coat of two inches of cement mortar of quality as specified. Missouri gray granite may be used for ringstones should the engineer



Section and Elevation.



Section A B.



Section C D.

Detail of Parapet.

158-FT. ARCH—WHEELING, W. VA.

so direct. All arch stone shall form a bond not less than one foot.

Backing.—The backing for the arch will consist of good substantial rubble, laid in cement mortar. All stone shall be perfectly sound and sufficiently large to make good, strong, well bonded work, and shall be laid in their natural quarry beds, in the most substantial manner and with as much neatness as this class of work admits of. The backing shall be brought to a smooth surface by a layer of concrete of sufficient thickness to accomplish the object.

Retaining Walls.—The retaining walls at the end of the spandrels and backing shall consist of rubble work laid in irregular courses of stone of generally 6 cu. ft. each, so disposed as to make firm and compact work; and no stone in the work shall contain less than 2 cu. ft., except for filling up the interstices between the large blocks in the heart of the wall. All to be laid in cement mortar. At least one-fifth of the wall shall consist of headers, extending full-sized through the wall.

Exterior Spandrels.—The exterior spandrel walls will extend from the back of the retaining walls to the extrados of the arch and be carried up and finished in the same manner as the wings.

The work will be of the same class as specified for the wings. The walls will be built up and bonded with the backing of the arch as far as the same extends; above the backing they will have a thickness of 3 ft. throughout. The joints between the courses of the wall and the extrados of the arch shall be finished with a 2 in. bevel on the exterior face of the wall.

Parapet.—The face of the two lower courses of parapet, the coping, both faces of 3 ft. panels, the returns of the 1 ft. pilasters and end posts shall be crandall dressed.

The inner faces of the pilasters and panels and belt courses will be flush and finished with a neat 1 in. tool draft around all joints.

The posts at the end of the parapet walls will, on the outer and end faces, be chisel dressed 1½ in. at the edges and left with the quarry face projecting not more than 3 in. beyond the draft lines. The joints in the parapet walls shall not exceed ¼ in., and in the coping $\frac{3}{16}$ of an inch. The coping stones shall be 4 ft. in length and break joints over the middle of the 1 ft. pilasters, which last break joints with the belt course below, the stones in said belt course being 4 ft. in length. Two vertical dowels will be used at the end of each coping stone.

Interior Spandrels.—The interior spandrels will be built of hard burned fire brick, laid in cement mortar. The depth of the arch rings will be 9 in. The spaces above the arches will be filled in with concrete to the sub-grade of the brick paving. At the springs of the arches wrought iron rods, 1 in. in diameter, will pass through the walls, spaced 5 ft. apart, with 6-in. washer plates, nuts and screws.

Slots, spaced 3 ft. apart, shall be left in the inner side of exterior spandrels and the outer side of the next interior spandrel, in which to set 4-in. 7-lb. I-beams for carrying water and gas mains.

Face Work.—The face of abutments, wings and spandrels above the ground line to be rock-faced ashlar and pitched off in straight lines to the face. The stone in the face shall be so selected and so arranged as to present a uniform color, or a pleasing blending of colors.

Roadway and Sidewalks.—On the concrete filling over the spandrel arches, a ballast of 3 in. of clean sand will be spread in which to bed the bricks with which the roadway is to be paved. The curbing will be of the best quality of Medina sandstone; no stone of less than 4 ft. in length will be allowed. The curb will be set in the concrete filling. The flagging will be of good hard sandstone 3 in. in thickness, not less than 3 ft. in width, and of length to cover the width of the sidewalk from parapet to curb.

Cement.—All cement shall be fresh ground hydraulic cement of the best brands of English Portland and of American cement. Every facility required by the engineer shall be furnished him by the contractor for making tests of the quality of the cement proposed to be used.

Concrete.—The concrete used shall consist of one part of the best quality of Portland cement, fresh ground; two parts of clean sharp sand and six parts of clean hard limestone, broken to such size that the largest will pass through a 2½-in. ring, the whole to be properly proportioned and thoroughly mixed; water, in such quantity as shall be directed, to be added to only so much of the material as can be used at once.

Insulated Electric Poles.—Four insulated poles, set in a bed of concrete, will be used to carry trolley wires of the electric railway and for illuminating purposes. The details are fully shown on the plan and the design.

Buildings and Structures of American Railroads.*

WATCHMAN'S SHANTIES.

BY WALTER G. BERG.

Watchman's, flagman's or switchtender's shanties (frequently called flag houses, switch houses or watch boxes) are used along railroads at exposed points, as crossings, drawbridges, sharp curves, dangerous cuts, or at yard systems, crossovers and leaders, where regular switch tenders are required. Owing to the large number of buildings of this kind necessarily in use on a railroad, the adoption of a standard or of a series of standard alternate designs becomes a matter of prime importance, either to satisfy the varying requirements at different sites, or to avoid sameness of design over the entire road. While the building is small and the design not difficult, the importance of studying the details carefully, so as to satisfy all requirements with the least expenditure of material and labor, is very apparent.

Where a standard design exists, the several parts of the building are generally turned out in large numbers at one of the shops of the road, and kept in stock. When a house is to be built, the finished material for it is shipped from stock and put together at site. If the size of the building permits shipment in sections or in one piece, then most of the framing and fitting is done at the shop, reducing the work at the site to a minimum. In this manner great economy and uniformity can be attained. Monotony of design need not necessarily follow, as the varying localities and requirements will call for several standards, while each design can receive certain modifications in the finish of the exterior, as the details of the panels, scroll work, finial, ridge roll, chimney top, etc., etc., sufficient to relieve the eye without in reality changing the important features of the plan.

The framework of these structures is in all cases wood, sheathed on the outside either with vertical boards and battens, or with plain or ornamental horizontal weather boarding, or with narrow tongued and grooved boards, or with corrugated iron. The roofing is generally tarred roofing felt, tin, fancy shingles, slate or corrugated iron. On some railroads corrugated iron for the roof and sides of the building covering a light framework of wood is very much in favor, as it is cheap, light and to a certain extent fire proof.

The general requirements for the buildings under discussion vary according to the exact purpose for which they are intended. Usually the size is limited owing to the location of the building among tracks or between tracks and the edge of the right of way. Inside the building there should be sufficient space for a small stove, a bench adapted for a man to lie down on, a locker and places for keeping signal flags, lamps, oil, waste, coal, etc. The windows should be so arranged as to command a good view of the tracks and other points that the watchman or switchman is expected to keep in sight.

The shape of the building can be either square, octagonal, or oblong. The square building is generally made about 5 ft. in the clear inside. The octagonal shape is especially serviceable where a large territory has to be controlled by the watchman, as small windows are easily introduced on all sides; its minimum size is about 5 ft. inside. A very usual size for oblong buildings is 5 ft. × 7 ft. inside; the least size known to be in use is 3 ft. 3 in. × 7 ft. 7 in. inside. The oblong style of building is capable of enlargement to any desired size for the accommodation of a larger number of men.

Buildings for car inspectors, car checkers, yardmen, trainmen, weighers, etc., are usually built very similar to oblong watchman's shanties, except that the size of the building, interior arrangements, and the spacing of doors and windows are varied to suit each case. For this latter class of buildings the Lehigh Valley Railroad and other roads are largely adopting frame structures, covered on sides and roof with light corrugated iron.

Following are descriptions of watchman's shanties actually in use.

Square Watchman's Shanty, Richmond & Alleghany Railroad.

The watchman's shanty of the Richmond & Alleghany Railroad, shown in figs. 1, 2 and 3, can serve as an example

Fig. 1—Front Elevation.

Fig. 2—Side Elevation.

of a cheap, unpretending standard for a watchman's or switch tender's house, much used on roads where a low first cost is of greater consideration than a pleasing exterior. The box is 5 ft. square in the clear inside, with

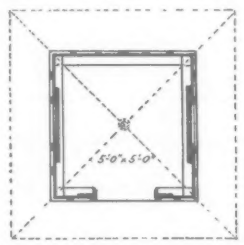


Fig. 3—Plan.

a 2 ft. door in front and small hinged windows on the sides. The frame is covered on the outside with upright boards and battens. The inside is not ceiled, which in colder climates, however, would be essential. The hip roof is covered with tin or tarred roofing felt. The height of frame from bottom of mud sill to top of plate is 7 ft. 6 in. The dimensions of the principal timbers used are as follows: mud sills, 8 in. × 10 in., laid flat; sills, 3 in. × 4 in.; plates, 2 in. × 2½ in.; nailer under plate, 1½ in. × 10 in.; nailer at half height of frame, 1½ in. × 6 in.; door posts, 1½ in. × 6 in.; rafters, 2 in. × 4 in.; outside boarding and roof boards, ⅞ in.

Octagonal Watchman's Shanty, Richmond & Alleghany Railroad.

The octagonal watchman's shanty of the Richmond & Alleghany Railroad, shown in figs. 4 and 5, offers more room and commands a better view of the surroundings than does the square standard. Although of cheap and plain construction, its general appearance is very neat. The squaring off of one side of the octagon to a full square forms a convenient place for a stove or for a bench long enough for a man to lie down on. Where these features are not essential, a regular octagon can be used just as well. The box is 6 ft. wide in the clear between parallel sides of the octagon. The frame, boarding and roofing are similar to the square standard of the same railroad, described above, except that the building is, in addition, ceiled on the inside. The dimensions of the principal timbers used are as follows: mud sills, 6 in. × 8 in.; sills and plates, 2 in. × 2½ in.; rafters, 2 in. × 4 in.; outside sheathing, 1 in.; inside ceiling, ¾ in., tongued and grooved boards; roof boards, 1 in., rough; floor, 2 in.

Watchman's Shanty, Alleghany Valley Railroad.

A watchman's shanty observed by the writer on the Alleghany Valley Railroad, in the suburbs of Pittsburgh, presents certain features in common with a large

*Copyright 1890 by Walter G. Berg, and condensed from a forthcoming book on the subject.

number of structures of the kind in question throughout the country. The building is oblong, 6 ft. × 8 ft. inside, with a double pitched gable roof. The frame is covered on the outside with horizontal, beveled weather board-

Fig. 4—Front Elevation.

ing. There is a door on the gable end facing the track, 2 ft. 6 in. × 6 ft. 6 in., made in two sections, one over the other, often called halved doors. The windows on each of the long sides of the room are placed near the front end of the building, the advantage being that a man standing just inside of the door is also opposite the win-

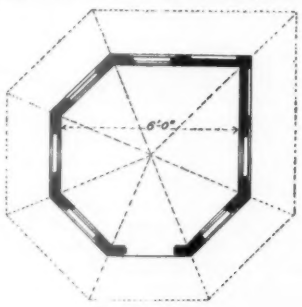


Fig. 5—Plan.

dows on each side. The height of frame from sill to plate is 8 ft. The principal timbers used are as follows: sills, 4 in. × 6 in.; corner posts, 3 in. × 3 in.; studding, 2 in. × 3 in.; plates, 3 in. × 4 in.; rafters, 2 in. × 3 in., spaced 16 in. centres; door, ¾ in. boards; sides, ⅞ in. beveled weather boarding; roof, 1 in. boards, covered with tin.

Watchman's Shanty, Philadelphia & Reading Railroad.

The watchman's shanty of the Philadelphia & Reading Railroad, shown in figs. 6, 7 and 8, offers a very hand-

Fig. 6–Front Elevation.

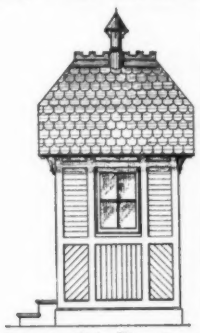


Fig. 7—Side Elevation.

some and attractive appearance. This is one of a number of standard alternate designs, which vary in the style of the roof and the detail of the panels and scroll-work on the outside, being otherwise all alike so far as the frame and the general features are concerned. The

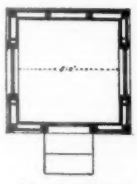


Fig. 8—Plan.

building is 5 ft. square in the clear, ceiled inside and outside with narrow tongued and grooved boards. There is a 26-in. door on the front, and windows are provided on each side. The roof is covered either with ornamental shingles or slate, and is finished off with a heavy, galvanized iron ridge cresting and ornamental chimney top.

Watchman's Shanty of Limited Width, New York Division Pennsylvania Railroad.

The Pennsylvania Railroad, in passing through Jersey City, Newark and other cities where its right of way is

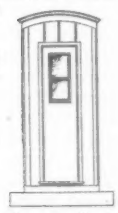


Fig. 9—Front Elevation.

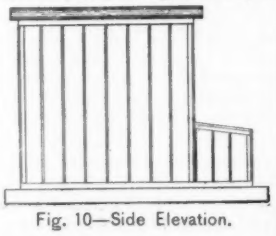


Fig. 10—Side Elevation.

limited in width, is frequently forced to locate a watchman's shanty between tracks. To meet this emergency the standard, narrow watchman's shanty, shown in figs. 9, 10 and 11, was designed, and has been found by the writer to have been successfully used with tracks as close as 15 ft. 9 in., centre to centre, or about 10 ft. 8 in. between the outside of the nearest rail-heads.

This narrow standard could no doubt be used with comparative safety where the tracks are even 6 in. or 9 in. closer than the figures given above, but the clearance would be very scant, and this spacing, therefore, not to be recommended. The building is 3 ft. 7 in. wide, out to

Fig. 11—Plan.

out, and 8 ft. 3 in. long, out to out, with a coal box on the rear 2 ft. 9 in. long. The height of the eaves above top of rails is 8 ft. When the building is located between a main track and a side track, the side facing the main track is placed 4 ft. in the clear from the gauge face of the nearest rail, while the side facing the side track is placed 3 ft. 6 in. in the clear from the nearest gauge face. The room is 3 ft. 3 in. wide, 7 ft. 7 in. long, and 7 ft. 6 in. high inside, in the clear. The door opening is only 19 in. wide in the clear; the door is 6 ft. 6 in. high, with a fixed sash in upper panel.

There is one window 18 in. × 3 ft. 6 in. large, in the rear end. The room is provided with a small cast-iron stove, taking up about 18 in. of floor space; a bench, 14 in. wide by 4 ft. long, and a locker, 9 in. deep and 2 ft. 6 in. wide, extending from floor to ceiling. A small stool or chair completes the interior outfit. The building is ceiled inside with narrow tongued and grooved boards, and sheathed on the outside with upright boards and battens. No studding whatever is used on the long sides of the building, parallel with the tracks, the inside ceiling being nailed directly against the outside boarding. At the ends of the building studs, 2 in. thick, are used at the corners and on each side of the door and rear window. The roof is slightly curved, made of tongued and grooved boards laid lengthwise with the building, and covered with tin.

The standard watchman's shanty of the Pennsylvania Railroad was shown in the *Railroad Gazette*, Nov. 12, 1880. It is an oblong frame structure, 5 ft. × 7 ft. inside, with a plain, double pitched gable roof. There is a 2 ft. × 6 ft. 3 in. door in front, and on each side of the room are large windows. A stove occupies one of the rear corners of the building, while the opposite side of the room is provided with a long bench. The roof projects about 18 in. on all sides, and is covered either with tin or tarred roofing felt. The building is ceiled on the inside only, the frame showing on the outside, arranged so as to produce a pleasing effect.

Watchman's Shanty, Lehigh Valley Railroad.

The watchman's shanty of the Lehigh Valley Railroad, shown in figs. 12 and 13, is an octagonal frame struc-

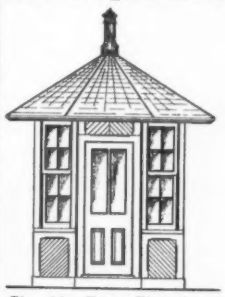


Fig. 12—Front Elevation.

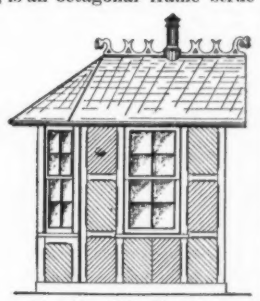


Fig. 13—Side Elevation.

ture with one side of the octagon on the rear of the house squared off to a full square, similar to the standard of the Richmond & Alleghany. The finish of the roof is neat and the building presents a very pleasing appearance.

On Steel Rails, Considered Chemically and Mechanically.

BY CHRISTER P. SANDBERG, C. E.

Under the two heads indicated in its title, the present paper will deal with the conclusions which were arrived at respecting steel rails in the discussion that took place at the International Railway Congress held in Paris last autumn.

I. STEEL RAILS CONSIDERED CHEMICALLY.

Safety and Durability.—As regards the safety and durability of steel rails, the general conclusion at the congress was that the rails should be as hard as is consistent with safety. Now hardness can be produced either mechanically or chemically or in both ways. By mechanical means it was no doubt obtained formerly in slow-running mills and with hammered blooms, and was largely the cause of the early Bessemer steel rails wearing so well. But at the present time, with the direct process of making steel and with quick-running mills, mechanical hardening has been largely done away with, and hardness produced by chemical means has to be relied on, which is not in favor of the safety of the rail. Then the question arises, What elements should be present in the steel to give it hardness, and what proportions of each are desirable for different conditions? The congress did not fix upon any definite chemical composition, but merely came to the general conclusion that the hard rail not only wears the best, but is also the safest. The latter is news to many besides the author, although this is the experience in France and Switzerland and particularly in Russia. From the evidence of these three countries it would look as if the hard rails are the best to resist crushing, and are also the best for safety, inasmuch as their tensile strength is not imperiled by the hardness of the steel.

In a diagram accompanying Mr. Werchovsky's report to the congress, upon tests made on the Russian state railways with best rails, good rails, brittle rails, and soft rails, the average chemical composition and tensile tests are given as follows:

	Best.	Good.	Brittle.	Soft.
Carbon, per cent	0.28	0.28	0.25	0.21
Manganese, per cent	0.67	0.60	0.54	0.74
Silicon, per cent	0.24	0.15	0.11	0.05
Phosphorus, per cent	0.11	0.11	0.18	0.19
Tensile strength, tons per sq. in.	42	41	38	33
Elongation, per cent	19	19	20	20
Contraction of area, per cent	36	43	47	53

The tensile tests tell very little; for the soft rails broke at only 33 tons per square inch, instead of the 41 tons for the good rails; while the brittle rails gave almost the same tensile strength as the good rails, and even more elongation and contraction. Could the transverse test under a falling ball have been substituted instead of these three slow and costly tensile tests, it would have discriminated better the merits of safe or brittle rails.

After the Russian experience gained by analyzing rails taken up from the road which had given good and bad results in actual work, the imperial commission appointed to test the rails are stated by Mr. Werchovsky to be now working in the converse direction, that is, making rails of the three different chemical compositions, and laying them down on the road and testing them under the traffic.

Favorable Effect of Silicon.—The high percentage of silicon, 0.24 per cent. in the steel rails giving the best results, is the striking feature in the foregoing analysis. Generally it is thought that, if phosphorus is as high as 0.11 to 0.15 per cent., silicon must be low, as well as carbon, if the rails are not to prove brittle under the traffic. . . . Some silicon is necessary, in order to produce sound steel, and its benefit is considered by the author to arise from its affinity for oxygen, whereby it has the effect of reducing the oxide of iron floating on the liquid steel after the sudden blowing in the converter. It first forms silica, which then takes up more oxide of iron and forms silicate of iron or slag, which floats on the top of the metal in casting, and absorbs all the carbonic oxide gas as it rises, thus making the metal very quiet in the mold, and the ingots almost as flat on the top as if they had been planed. It consequently renders steel castings solid, as is well known in steel foundries, where 0.25 per cent. of silicon is the usual proportion for obtaining a solid casting. In the absence of silicon, and with carbon as the hardener, the oxide of iron with the carbon in the steel forms carbonic oxide gas, which boils the metal before escaping, and causes bubbles and a spongy top in the ingots. These bubbles are to a certain extent squeezed together afterwards in the rolling, but never so as to form such a sound mass as if the casting were solid and free from them.

In the wearing of rails made of these two different kinds of steel, the silicon steel rail is solid and does not peel or laminate. The low carbon steel rail, containing less than 0.30 per cent. of carbon, becomes deformed, spread out, and crushed at the rail ends, and as it wears it peels off in thin scales, arising from an unsound or spongy ingot. Even when the carbon is as high as 0.40 to 0.50 per cent., a tolerably solid ingot cannot be obtained without silicon to the extent of at least 0.10 per cent.; and this percentage of silicon is therefore what the author has generally preferred for steel rails.

Experiments on High Silicon Steel Rails.—As there would be more chance of success from high silicon steel rails made in England, where phosphorus does not amount to half as much as in Russia, the author determined to take the question up and to make experiments in order to see whether there really was any advantage in silicon for producers and users alike. On communicating with some of the leading men of both classes in several countries he found that their experiences were widely different. The question therefore could be solved only by impartial investigation and direct experiments, which were accordingly commenced. Preliminary results were soon obtained, which are embodied in Table 1* appended, showing chemical and mechanical tests. These were so far satisfactory, and from them the three following conclusions may be drawn:

1. That a heavy steel rail, containing silicon up to 0.30 per cent. and the same amount of carbon, will stand any ordinary transverse test under a falling weight, up to say one ton falling 15 ft., midway between bearings 3 ft. apart, provided the phosphorus is low, say under 0.07 per cent., and the manganese not too high. So the large amount of silicon does not seem to make the rail brittle, judging at least from these experiments.

2. That silicon up to 0.30 per cent. makes no visible difference in the hardness, so far as is shown by deflection under the falling weight or by impact or by tensile tests, the different results obtained being altogether dependent upon the proportion of carbon.

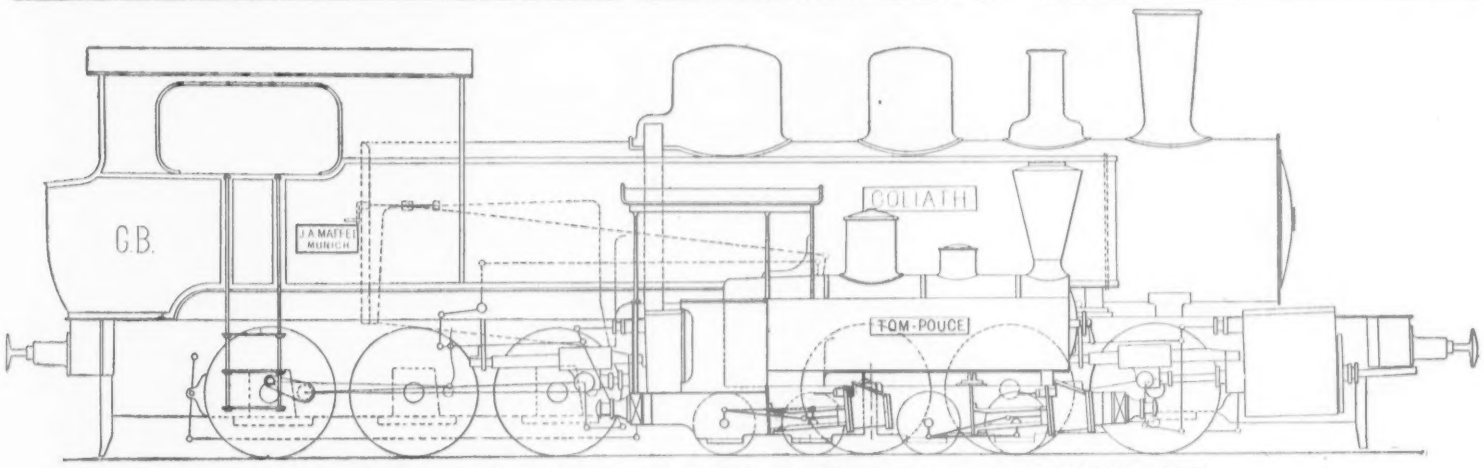
3. This silicon at 0.20 per cent. and upward gives a sound ingot with a clean solid top, which rolls out into a rail with fewer defects than steel that contains only 0.06 per cent. of silicon, other impurities being the same.

These earlier conclusions, however, require to be verified on a larger scale, having been tested so far by only a few single casts. A second series of a greater number of experiments were therefore made. The results in Table 2 are of a very different character from those in Table 1. From Nos. 1 to 15 of the chemical and mechanical tests in Table 2, the three following final conclusions are drawn:

1st. By silicon up to 0.30 per cent. with carbon up to 0.30 or 0.40 per cent. the steel is neither hardened nor made brittle, and its tensile strength is diminished in only such a small degree as not to imperil the safety of the rail, judging at least from a severe transverse impact test under a falling weight.

2d. Silicon up to 0.20 or 0.30 per cent. certainly makes the steel quiet in casting and free from small honeycombs or blisters; but in cooling from a fluid to a solid state it draws or shrinks much more than rail-steel containing only 0.10 per cent. of silicon, or less. The ingots, particularly large ones weighing a ton or more, are very liable in cooling to form a hole in the centre, which, when the ingot is rolled into rails, produces in the web or neck of the rail a seam not welded, as in test 11 of Table 2. From this fault a fracture of the rail may occur, and may be more disastrous than the peeling off in thin scales that arises from small blisters round the exterior surface of the ingot, which are formed when silicon is low. Thus high silicon steel can be used with safety in small ingots only, say of not more than half a ton. This explains the favorable results obtained with such steel in Russia, where probably small ingots are made for single rails only. In the large ingots of say one ton and upwards, for three or four rails as now rolled in England, more than 0.10 to 0.15 per cent. of silicon should not be aimed at, on account of the greater shrinkage produced thereby. The danger is therefore seen of fixing upon one composition as applicable to all makes of steel; and it is clear that care should be taken in considering all the reasons before changing the practice. For instance, what will do for working small ingots in Russia and elsewhere will not answer for large ingots as worked in England; and engineers would do well to leave the silicon question to the railmaker, who in every case has the best experience of what suits his own requirements and those of the users generally. These results respecting shrinkage arising from silicon in steel agree with those given by Mr. Hadfield in his recent paper on alloys of iron and silicon (Iron and Steel Institute *Journal*, 1889, page 222);

*Tables 1 and 2 are not reprinted, the results being well summed up in the text.—EDITOR.



THE LARGEST AND THE SMALLEST ARTICULATED LOCOMOTIVE.—MALLET'S COMPOUND SYSTEM.

but as he experimented with ten times as large a percentage of silicon as in the case now under consideration, and not directly upon rails, the present experiments may be a better guide to the solution of the question of silicon in rail steel.

3d. As for a high percentage of silicon in basic steel it has the same effect on shrinkage as in the Bessemer steel. But it should be remembered that silicon, added in the form of hematite pig-iron before the manganese is put in the ladle, is what prevents the rephosphorization of the basic steel; and that without this valuable discovery, made by Mr. E. Windsor Richards when manager of Messrs. Bolckow & Vaughan's steel works at Middlesbrough, the basic steel rail would have died a natural death. However there is only just enough silicon added to take up the oxide of iron and protect the steel from rephosphorization, and none or very little is left in the steel, say from a mere trace up to only 0.06 per cent.; and as there would be the same shrinkage in large ingots as with high silicon Bessemer steel, no experiments with basic steel have been found necessary.

Thus both for Bessemer and basic steel, the presence of such a high percentage of silicon as is used in Russia, say 0.25 per cent., seems not applicable in England, unless small ingots were reverted to; which again would be a disadvantage, because the larger ingots mean more work put upon the steel, and therefore the better are the rails. The ingots experimented with in Table 2 weighed 28 to 30 cwts. each, enough for four rails of 80 lbs. per yard and 30 ft. long; while those in Table 1 were much smaller, and consequently presented no apparent shrinkage and no holes in the centre. In Bessemer steel rails therefore the author sees no reason to interfere with the silicon, and he recommends leaving it altogether to the option of the maker. For tires and axles, which are made from smaller ingots than rails, it might be a decided advantage to use up to 0.20 per cent. of silicon, in order to get them solid; and he believes this is done by the makers when they have no chemical composition stipulated.

There seems to be no difficulty in obtaining a high percentage of carbon—0.40 to 0.45 per cent.—by the basic process as well and to the same extent as by the Bessemer, though with somewhat less silicon in the basic steel; and this should annul the general condemnation of the basic rails that was pronounced at the congress, simply because they were made by the basic process.

Hardness Dependent on Carbon and Phosphorus.—As regards the hardness of steel rails, it would appear from these experiments that silicon is of no consequence, everything depending upon the percentage of carbon and phosphorus. The changes produced by the hardening, which practically commences with about 0.40 per cent. of carbon, are just what alter the quality of steel rails according to the manner of cooling them. The mode of cooling should be studied very carefully, and may be found to require covered hot banks, in order to obtain the most uniform result in the wearing of the rails.

Increase in the hardness of steel rails was recommended at the congress by engineers from many different countries; but the author has still sufficient dread of the results which might follow from fractured rails to prevent his going to any extreme in that direction; and considering the great variety of conditions to which rails are subject, he would not attempt to prescribe any particular degree of hardness as being applicable to all countries. Where so many factors are involved, there are hardly two cases alike. In the manufacture it is necessary to consider the varying amount of all elements present in the steel worked in different districts, the section of rail employed, the mode of rolling adopted, and whether the straightening is done by cambering the rail while hot. The last is a very important operation, and the author is glad to find that the leading rail-makers in England have now followed his advice and adopted the hot cambering of the rail, in order to lessen the effect of the barbarous cold-straightening by presses. Then after the rail has been laid on the road there are questions of climate, drainage, ballast, sleepers, weight of rolling stock, speed, amount of traffic, etc., all of which must be taken into account, and their importance decided upon according to particular circumstances. At present the users of steel rails have nothing much to complain of; their safety is much greater than that of iron rails; their durability is at least three times as great and their price is much lower. Why then overdo the hardness and thereby risk the safety? The greatest merit in an engineer as well as in a rail-maker is to know when to let well enough alone; and the author certainly intends to exercise this discretion, and will not let himself be led astray by any wonderful chemical composition of steel rails; otherwise, serious accidents may accrue, and then, to use a Sheffield rail-maker's expression, the services will be required not only of a chemist but of a druggist as well.

TO BE CONCLUDED.

The Largest and Smallest Articulated Locomotive.

Mons. A. Mallet, the well-known French engineer, sends us the illustration herewith showing the comparative proportions of two articulated locomotives built on his compound system, the largest and the smallest ever built. The drawings are superimposed one upon the other and the large engine, where the lines conflict, is shown by dotted lines and the small one by full lines. The large machine was constructed by J. A. Maffei, of Munich, on the Mallet compound system for the Gothard Railroad in Switzerland, and the small one by Decauville, of France, also on the Mallet compound system.

An articulated locomotive may be described as having two sets of cylinders, drivers and parallel rods arranged to swivel independently on curves, but carrying a common boiler and fire box. Only a few such engines are in use, the most famous in this country being the "James," built by the Mason Machine Works, of Taunton, Mass., 15 or 20 years ago. The general dimensions of the locomotives here illustrated are as follows:

	Decauville.	Gothard.
Diameter high-pressure cylinder	7.28 in.	15.5 in.
" low "	11.0 "	22.4 "
Stroke of both cylinders	10.23 "	25.2 "
Diameter driving wheels	23.6 "	48.5 "
Driving wheel base, each group	2.8 ft.	9.0 ft.
" " total	9.2 "	27.6 "
Total length of engine	17.6 "	46.0 "
Tank capacity	357 gals.	2,118 gals.
Coal capacity	1,102 lbs.	11,020 lbs.
Grate surface	5.3 sq. ft.	23.1 sq. ft.
Heating surface:		
Fire box	25.0 "	102.3 "
Tubes	215.0 "	1,600.0 "
Total	240.0 "	1,702 3 "
Boiler steam pressure	171 lbs.	171 lbs.
Weight of engine, empty	20,200 "	143,000 "
" " working order	25,500 "	187,000 "
Gauge of track	1.97 ft.	4.75 ft.

Railway Splice Bars and Specifications for Their Manufacture.*

BY ROBERT W. HUNT.

No matter how perfectly sectioned or skillfully manufactured the rails used may have been, or with what care the roadbed may be maintained, legitimate results from these important factors cannot be secured unless proper attention is bestowed upon the joint fastenings.

In this country splice bars of various patterns furnish the practically universal joint. Other forms have been used, and are now being experimentally tested, but the typical American rail joint consists of angle plates or splice bars. At the same time it is true that scarcely a railroad engineer is satisfied with his joint. He may consider it the best of which he has knowledge, but at the same time he is well aware of many of its weak points.

Even after the discovery of the much-desired and long-sought "perfect joint," it will require some years to displace and replace the many thousand tons of angle plates now in service. But, apparently, this discovery has not yet been made and, while we are waiting for it, it would be well to endeavor to secure as good a splice bar as is practicable under existing commercial circumstances.

I do not propose discussing sections, as they must depend so much upon the rail used, character of joint, etc., but will confine myself to presenting specifications for manufacture which will, in my judgment, help engineers to obtain well-finished bars of good material, and which, at the same time, ought not to add anything to their cost.

As is well known, practically, all iron splice bars are at present made from old iron rails, or iron scrap. The supply of the former material is rapidly diminishing, and the quality of the latter is usually unknown and doubtful. For these reasons, and because I believe the metal will in every way make a better bar, I favor steel. I am fully aware that, in many cases, the use of steel splices has not been satisfactory; but I believe these failures resulted from faults either in the grade of steel used or in the physical treatment of the bars.

Steel rails, steel bridge members and steel boiler plates were all condemned in their early history, but are now conquerors in their various fields. In my specifications I have endeavored to provide for suitable material, whether it be iron or steel, and I insist upon a practically perfectly-finished bar. If bars are not straight in surface they cannot fit the "fish section" of the rails, and, if out in line, they must either not come to place or the track bolts must perform service for which they are not designed. If, in punching, the bars are bulged opposite the bolt holes on either top or bottom line, it is evident that they will bear against the upper side of the rail flange or the under side of the rail head at those points only. Under all circumstances the punching and slotting should be carefully done, but this is of prime importance when steel is used. I therefore call for the use of the Kennedy spiral, or some other shearing punch. Such tools put considerably less strain upon the metal, and are by so much easier upon the punching presses. Hence the interests of both producer and consumer will be well served by adopting them. It is necessary that the slots in steel plates should have well-defined fillets at their corners.

With these introductory remarks I submit my proposed specifications.

Specifications for Iron Angle Splices.

SECTION 1. The iron shall be of good quality, and plates taken from among those offered for acceptance, when nicked on one side and broken suddenly over an anvil, at a freezing temperature, must show at least 70 per cent. of fibre. If four plates out of six, taken at random from a car load, fail under this test, the whole car load shall be rejected.

SEC. 2. The bars shall be rolled true to the templates represented by the blue prints which will be furnished to the rolling mills by the railroad company. They shall be rolled smooth, and without fins or checks, and punched and slotted accurately to the dimensions given in the blue prints, and specified in the orders or contracts.

SEC. 3. The punching shall be performed in such a manner that the plates will not be bulged on either the upper or lower lines opposite the bolt holes, and the holes must be free from burrs. The Kennedy spiral, or other shearing punches, shall be used. The ends of the plates shall be without burrs or kinks, and the plates shall be practically straight in all directions.

SEC. 4. The railroad company's inspectors shall have power to reject any plates in the manufacture of which *any* of the above specifications have been violated.

Specifications for Steel Angle Splices.

SECTION 1. The metal shall be made by either the pneumatic or the open-hearth process.

SEC. 2. By preference, it shall not contain over 0.10 per cent. of phosphorus and not over 0.17 per cent. of carbon. Should the phosphorus exceed 0.10 per cent., the carbon shall not be over 0.12 per cent.; but the phosphorus shall never exceed 0.12 per cent.

SEC. 3. The steel must be heated with care, and in no case shall the heat be brought up to the limit of safety.

SEC. 4. The bars shall be rolled true to the templates represented by the blue prints which will be furnished to the rolling mills by the railroad company. They shall be rolled smooth, and without fins or checks, and punched and slotted accurately to the dimensions given in the blue prints and specified in the orders or contracts.

SEC. 5. The punching shall be performed in such a manner that the plates will not be bulged on either the upper or lower lines opposite the bolt holes, and the holes must be free from burrs. The Kennedy spiral, or other shearing punches, shall be used. The ends of the plates shall be without burrs or kinks, and the plates shall be practically straight in all directions.

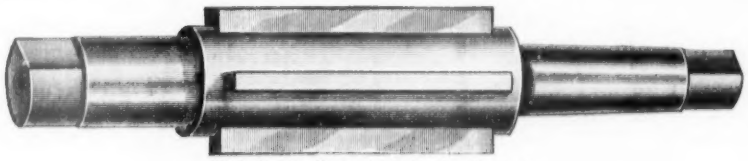
SEC. 6. Rolling-mill companies, furnishing plates under these specifications, shall give to the inspectors analyses showing the amount of carbon in all the heats of metal which are used in making the plates and, whenever required, shall also give the amount of phosphorus.

SEC. 7. The railroad company's inspectors shall have power to reject any plates in the manufacture of which *any* of the above specifications have been violated.

*A paper presented at the Washington meeting (February, 1890) of the American Institute of Mining Engineers.

Nicholson's Expanding Lathe Mandrels.

We illustrate herewith a machine shop tool, designed to do the work of the ordinary solid mandrel at less expense and with better results. It consists of a tapered arbor made of the best tool steel, the centres of which are made at the standard angle and counterbored to prevent damage from driving. The arbors are carefully hardened and finished by grinding with special machinery. Four steel jaws ground to a perfect bearing on the arbor are accurately fitted through four slots in a sleeve made of weldless cold-drawn steel tubing. This sleeve guides the jaws on the arbor and keeps them in position. The jaws are hardened and then ground parallel while upon the arbor with which they are to be used, making them positively true with it. The jaw bearing is long and therefore adapted for holding heavy as well as light work. By allowing the work to



Nicholson's Expanding Lathe Mandrel.

project over the end of the jaws, it can be faced into the bore without danger of cutting into the arbor, which frequently happens in the use of solid mandrels. Special mandrels are made for turning eccentrics with a number of different throws on the same arbor. The capacity of the standard set of nine mandrels is "any possible size from one inch to seven," thus performing the work of numberless solid mandrels. They are quickly adjusted to the work and their holding power is ample for all needs. Every one familiar with machine shop work is aware of the large amount of labor spent on solid mandrels in renewing and keeping them up to size, which by the use of such a tool as this would be much reduced. These mandrels are extensively used by a number of the best machine shops and give excellent satisfaction, as shown by the testimonials received by the makers. These mandrels are made by Messrs. W. H. Nicholson & Co., Wilkesbarre, Pa.

The First Cable Car Road in France.

This Parisian line, which has been actively pushed on during the last four or five months, will probably be in operation by September. It is situated on the northern side of the city of Paris, commencing on the quay of a canal branching off from the Seine. From this spot it rises continuously to its terminus, only two kilometres distant, so it is but a short line. The grade varies considerably, and 7 per cent. is the steepest. The streets traversed are the rue du Fauburg du Temple and the rue de Belleville, and it is on the latter, at the top of the grade, where the engine house is now building. This will be installed with two 50 H. P. Corliss engines by Garnier, each capable of developing 70 H. P. The track is being most solidly and carefully laid with the usual grooved European rails, which in this case come from Lille, in northern France. The cable is 1⅛ in. diameter, and comes from Lyons. Its speed will be 3 metres per second or about 6.7 miles per hour.

If the line resembles any existing one at all it will probably be most like that of the Birmingham (Eng.) tramway, whose working had been studied previous to the commencement of this.

The usual Paris street car is an excessively heavy vehicle, and those to be adopted for the line in construction will be like the Nord—about the lightest type one notices in that city. Naturally, as the beginning of a new system, there will be no radical departures from what has found to be the best practice in America and England. As but one car will be hauled, the work of the grip will be light. That monotonous discord—bell on the axle—will not be considered more necessary than on the elegant 125th street (New York) line. Instead, a pneumatic trumpet will be used, as with the Lamm & Francq fireless engines, the ordinary cars, the 'busses ambulance wagons and all like traffic of Paris.

The whole work is being carried on by numerous contractors for the promoters—municipality of Paris—and under the charge of chief engineer Bienvenu, who gave his personal opinion that such roads were not destined for development in Paris, in view of the advances of electricity and its economy in being adaptable to any existing line; the overhead wire he considered inadmissible from the look of the thing on Paris streets. At present stored steam is the most favored power.

C. R. K.

A System of Rail Sections in Series.*

BY P. H. DUDLEY.

[WITH AN INSET.]

A quarter of a century of service of steel rails on our oldest railroads, many of which have changed their standard sections three or four times, has furnished, and is furnishing, excellent opportunities to study their wear and behavior in the track. Such experience is valuable for the design of new sections now required to meet the constantly increasing severity of railroad service. Before presenting the new sections for consideration, I will briefly call attention to some features of past experience.

For convenience of study, rails may be separated, according to their weight and height, into four groups, viz.:

1.	Rails weighing per yard from	52	to	60 lbs.,	and	3⅛ to 4	in. high.
2.	"	"	"	60 to 72	"	4⅛ to 4½	"
3.	"	"	"	72 to 90	"	4¾ to 5	"
4.	"	"	"	85 or more	"	over 5	"

Experience in this country is confined mainly to sections in groups Nos. 1, 2 and 3.

During the past few years I have had the opportunity to run my car over many thousands of miles of railroad laid with the principal sections in use, and to obtain diagrams showing their deflections, permanent set, and, in a great measure, their manner of wear.

The First Group.—The first steel rails imported, and those manufactured here, were light sections—included in the first group—and many of them, being rolled in rolls used for rolling iron sections, have pear-shaped heads 2⅝ to 2¼ in. wide, the base being heavy and from ⅛ to ¼ in. narrower than the height. These rails were laid upon ties of solid timber at least 8 in. face, spaced 2 ft. from centre to centre. The moments of inertia of these rails were low, only ranging from 8 for the lightest sections to 12 for the heaviest. The deflections were of course great, but the quality of the metal was excellent. It was physically hard and tough, did not easily take a permanent set, and wore very smooth. The loss of metal per million tons of traffic was, for Sir John Brown & Co.'s rails, on tangents, .01 to .015 lb. per yard; on gradient tangents, .015 to .02 lb. per yard; on gradient curves, .025 to .03 lb. per yard. The rails of Charles Cammell & Co., Landore & Siemens and the Barrow Company were quite as good. Several of the American brands were excellent, and by many railroad officials considered equal to the imported.

The wheel tonnage, however, was much lighter than at present, being 4 to 6 tons per locomotive driver, 2 to 2½ tons per freight car wheel, 3 to 3½ tons per passenger coach wheel. The cutting of ties under these rails was rapid even for the light tonnage.

The Second Group.—Observing these features led to the design of stiffer and heavier sections in group No. 2 of the Ashbel Welch type of 60, 63, 65 and 67 lbs. per yard. His design was made in 1866, and by 1870 several sections were in service. These rails were from 4⅛ to 4½ in. high, had heavy webs and bases, the latter usually ¼ to ⅝ in. less in width than the height of the section.

The metal in many of these sections was intended to be fully equal to that of the earliest rails; and it wore well, though, as we now know, the loss of metal should be greater per million tons of traffic than on the lighter and more flexible rails. Many thousands of tons of these rails were laid by the trunk lines, some of them being still in service, while a large part was removed, to be replaced with heavier sections, on account of increased traffic, and not because the rails were entirely worn out.

The satisfactory observed wear of these rails led to the conclusion that the only wear was upon the head, and, therefore, that the governing principles of new designs of rail sections should be a shallow base as wide as the height, and a thin web supporting a narrow and deep head for wear. After 1873 these principles were adopted in practice, and millions of tons of rails of this type were put into the track (most of the sections being included in group No. 2) prior to the year 1890.

In many cases, where the change was made from one type of section to the other, the weight per yard remained the same. These being put in the same tracks, carrying yearly the same tonnage, have furnished excellent opportunities to study the comparative wear of the two types. It is now well known that the wear of the deep-headed type has been far more rapid than that of the shallow-headed type. Rails of the former class take a permanent set in the track much more quickly, and many have failed by loss of metal on the base, through wear and oxidation.

The tendency of these deep-headed and light-based rails to take a permanent set on the track is much greater than that of rails having heavier bases, because, the neutral axis of the section being so high, the metal in the head is readily overstrained, taking a set in the head of the rail, which assumes either the first or second form, as shown by figs. 10 and 11 in my previous paper (Trans., XVIII., 228). After the rails have taken a permanent set, the receiving ends of soft rails with narrow heads flatten out, making a depression in the surface of the rail which cannot be surfaced.

Last season I had under observation several miles of 67-lb. rails of 1882, width of head, 2¼ in., in which a number of the receiving ends of the rails had widened to 2¾ in. The rails were not only examples of deep-headed rails, but also of the theory that chemically soft rails are best for wear. The three 72-lb. sections in Group No. 2 are only alike in height and weight; one has a 5-in. base and Sayre type of head (a difficult section to make physically hard and smooth, though well executed by one manufacturer), and stands up well under the traffic.

Two other manufacturers, believing that soft rails were the best for wear, made them much softer; but these show an increase of wear compared with the harder ones and some of them have taken so much permanent set as to require removal and restraightening.

The Third Group.—Rails, 4¾ to 5 in. high, represent recent sections designed to meet the exigencies of present railroad service. There is one 72-lb. section, 4¾ in. high, base same width, large radii of corners on top of head, the sides of the latter inclining to the web of the rail. This is the "Forney type," and is used by one road. The Sayre section of a 76-lb. rail, 4¾ in. high, 4¾ in. width of base, is used by a few roads.

The first of the 5-in. rails, the 80-lb. rail which I designed for the New York Central and Hudson River Railroad in 1883, is described in my previous paper (page 228), and, I may add, is the pioneer of the broad and shallow heads and thick bases for heavy rails. With an increase of 8 lbs. over the 72-lb. 4½-in. rails a gain of 40 to 50 per cent. in stiffness is made, which is an important advantage in saving of ties and of labor in maintenance of track, and in producing a marked reduction in train resistance. Nearly six years' experience with some of these rails (about 200 miles of track laid with them; 30,000 tons to be put in this year) is good evidence that the section is meeting the expectations of the consumer.

Fig. 1 shows a section I designed in July, 1888, for 75-lb., 5-in. rails, 5-in. base, for soft wood ties for the New York & New England Railroad, then under the general management of Mr. W. P. Shinn, ex-President of this Institute, and now President of the American Society of Civil Engineers. Mr. Shinn has had large experience, not only as a consumer, but as a manufacturer of rails. After making an inspection of his road, I suggested that, by using 75 lbs. of metal for their rails, a section could be designed nearly 50 per cent. stiffer than their present 66-lb. rail, which would be of great advantage for the heavy wheel tonnage of their coal cars. Below is a table giving the deflections of this rail under loads, upon supports 30 in. apart, which shows that the section is a very stiff one, as I intended it should be, for their service, with a minimum amount of metal. [We have given only the results at each 10,000 lbs. load. The complete table gives each 2,000 lbs.—EDITOR.]

REPORT OF TESTS made at Watertown Arsenal, May 14, 1890, for P. H. DUDLEY, C. E.

No. 6,700, Mark 23.—Steel rail, from New York and New Eng and Railroad, 75 lbs. Branded "Lackawanna I. and C. Co., Scranton, 4-89." Rail supported on end bearings, 30 in. apart. Loaded at the middle.

Applied loads. Total lbs.	Deflections.	Successive deflections.	Deflection sets.
2,000	.0	.0	.0
10,000	.0098	.0023	.0004
20,000	.0211	.0021	.0007
30,000	.0322	.0020	.0008
40,000	.0430	.0022	.0009
50,000	.0534	.0024	.0011
60,000	.0633	.0019	.0012
70,000	.0738	.0020	.0015
80,000	.0843	.0023	.0020
90,000	.0950	.0027	.0033
100,000	.1105	.0035	.0075
110,000	.1409	.0087	.0250
120,000	.2025	.0156	.0760
130,000	.2900	.0214	.1502

No. 6701, Mark 33.—New York Central & Hudson River Railroad, 80-lb. rail. Actual weight of piece tested, 78 lbs. per yard. P. H. Dudley. New rail, branded "Scranton Steel Co., 3-89." Rail supported on end bearings 30 [illegible] art. Loaded at the middle.

Applied loads. Total lbs.	Deflections.	Successive deflections.	Deflection sets.
2,000	.0	.0	.0
10,000	.0095	.0095	.0
20,000	.0205	.0110	.0002
30,000	.0316	.0111	.0002
40,000	.0423	.0107	.0003
50,000	.0525	.0102	.0003
60,000	.0623	.0098	.0004
70,000	.0723	.0100	.0005
80,000	.0823	.0100	.0008
90,000	.0927	.0104	.0015
100,000	.1035	.0020	.0027
110,000	.1160	.0027	.0052
120,000	.1304	.0027	.0 95
130,000	.1545	.0067	.0228
140,000	.2100	.0153	.0654

Correct.—J. E. HOWARD.

D. W. FLAGLER,
Lieut. Col. Ordnance Dept., U. S. A., Commanding.

In 1889, 1,800 tons of this type were put into service, making excellent tracks, fully as smooth as those made by heavier 5-in. rails. It represents a type of section, very stiff, but of light weight, which can be economically used in many localities.*

There are several sections of 85-lb. 5-in. rails of this group, all of the deep-headed type, with the exception of the Delano section. There is one 90-lb. rail, 5 in. high, same width of base, of the deep-headed type, though the base is heavy and web three-quarters of an inch thick. For the weight of metal, the moment of inertia of the section is low.

The Fourth Group.—Of the fourth group, but a few rails are in the track in this country, while abroad there are a large number. These stiff sections will be required here, as soon as fewer ties are used per mile, or upon the general substitution of metal ties for wooden ones, with greater spacing. The New York Central Co. has put in a few hundred metal ties, spaced 3 ft. from centre to centre, under the 80-lb. rails.

Of groups Nos. 1, 2 and 3, each succeeding one has shown a decided reduction in the deflection of the rails, and consequent improvement in the smoothness of the tracks under the trains, provided the rails were well finished.

PHYSICAL HARDNESS OF OLD-STYLE RAILS.

Whether the scale of hardness of the older rails is estimated by indentation with the pyramidal cutter, elastic limits of the steel, or ultimate strength, they are found to be much harder than most of the rails of the deep-headed type.

Samples of rails of one brand of manufacture, from their first yearly output to date, for experiments upon hardness, are difficult to obtain. Those which I have succeeded in getting indicate a considerable reduction in hardness from 1870 to 1885, and an increase since the latter date. The wear of the rails increased as the hardness decreased. The opinion that chemically soft rails would wear best caused a marked reduction in the physical hardness of rails from many mills in the output for 1882, 1883 and 1884.

Where railroads are laid with a uniform quality of rail, experience has now shown that the wear is not uniform per mile, but is modified by different topographical features, curvature, character of roadbed, classes of motive power, stopping and starting of trains at stations, etc. At connecting points, large yards and terminals, the drilling for the distribution of cars and making them up for out-going trains doubles the movements of locomotives, and rapidly increases the wear at such points. The section of rail shown in fig. 2 was taken from one used at the entrance of the freight yard of the New York Central & Hudson River at East Buffalo. It was in service 18 months, being permitted to remain in the track until the sides of the head were bent to the web of the rail. Usually rails require replacing at the same point yearly. Rails from same lot, after 13 years' service in the main track, are still in fair condition. Two or three years is the life of many rails at the entrance of large yards.

According to the diagrams of several roads in regard to the renewal of rails, the least wear takes place, as a general rule, upon the tangents away from stations, increasing on the gradient tangents. On curves, the rate of wear is even greater than on the gradient tangents, and greatest where curve gradients occur.

The wear on rails on curves is of two classes: 1st. The ordinary wear on the surface of the rail, augmented by longitudinal and transverse slipping of the wheels. 2d. A severe abrasion or cutting on the inner head of the outside rail. The wear on different roads is not the same, because different systems of tracklaying and different joint fastenings are employed.

I have designed the rail sections, to which attention is here called, in series of three each, to provide for this unequal wear on the various portions of the road. The rails of each series are designated by letter, and the weight of each section, increasing by five pounds each, is further designated by a prefix to its letter indicating its rank in the

*A paper presented at the Washington meeting (February, 1890) of the American Institute of Mining Engineers.

* Since this paper was written I have made an extensive inspection trip over railroads in the South and West, and am convinced that for many years light, stiff sections will be of far more value to them than the same weight of metal put into a form not as stiff, but apparently of greater wearing capacity.

series, viz.: the first section of the series is called "light," the second one "medium," and the third "heavy." The respective designations will be rolled on their webs in manufacture.

The light sections of series A and B are made especially stiff for the weight of metal used, having also broad heads, well-supported by large curves, giving a far greater wearing capacity than might at first seem likely when comparing them with rails having deeper but not so well-supported heads. The medium section of the series has a slight increase of width of head, but far greater wearing capacity, *i. e.*, a greater amount of metal to lose per yard to provide for the increased severity of their location under the same tonnage. The stiffness of the section is also increased to sustain the service better, reduce the wear upon the ties, and equalize it more nearly with the rate upon the levels. This will be far more important where "treated" ties are used, and also with metal ties, which will come into use on our large lines within a short time.

The still stiffer and broader-headed "heavy" section for the curves provides a very effective method for reducing the now excessive abrasion of the inner head of the outside rail of the common type on curves. This statement of the fact of reduced abrasion is not only based on a theoretical consideration of the case, but a large experience in observing the results of such a system in service.

Fig. 3 shows the curtate cycloids described by four selected points in the flange of a wheel rolling on the rails. When the axle is at right angles to the rails on tangents, or radial to the rails on curves, the abrasion is slight. If, however, the axle is inclined to the rail, so that the flange of the wheel touches the rail forward of a perpendicular from the centre of the axle, then the abrasion increases with the degree of inclination. Increasing the bearing surface of the rails on curves makes the worn wheels especially run more nearly radial to the curve, lessening the abrasion.

PROPOSED SECTIONS.

In designing the sections of rails, I have made five series, giving 15 sections of 12 different weights, ranging from 50 to 105 lbs. for ordinary steam railroads, and four series of light rails for mining, agricultural, manufacturing and construction purposes. The latter are not included in this paper.

By looking at the drawings of the sections, it will be noticed that the inclined surfaces of the section are given by ratio of length of base to the height of the perpendicular, instead of in degrees. The line of the radii for the sides of the webs is above the centre of the web, so as to make the lower portion of the web thicker for four important reasons and purposes, viz.: 1st, to more nearly equalize the heat of the section between the base and the head, permitting colder rolling and lessening the amount of cold straightening required; 2d, to lower the neutral axis, better equalizing the strain of the metal between the base and head, and checking the tendency to permanent set; 3d, to increase the moment of inertia of the section, and 4th, to check the tendency of the web to bend near the base of the rail under heavy traffic.

The bases of the rails are all thick and of less width than the height of the section, designed so, largely for the purpose of permitting the sections to be made as physically hard and tough as the first rails used. Rails made for a long service of years must have a heavy base to provide for wear and oxidation.

Series C, D and E will be used largely upon metallic ties or upon the plates, where they will be held firmly upon the bearings.

Observations on the broad-headed 80-lb. rails of the New York Central & Hudson River show that they have far less tendency to roll in the track than the 4½-in. rails with narrow heads, having bases 4½in. wide with thin edges. On tracks laid with the latter it is common to find the spikes, particularly those on curves, cut from ⅛ to ⅓ off at the throat. This does not occur with the ⅜-in. edge of the 80-lb. rail base, and the latter rail is kept in gauge on the curves with far less labor than the narrow-headed ones. Widening the base of the 80-lb. rail to 5 in. would not improve this feature. In an inspection with my car on April 11, before any work had been done in the spring upon the tracks, I found in 150 miles of the 80-lb. rails only a few rails in four miles that were $\frac{1}{10}$ of an inch wide gauge. This is unprecedented for even a fall inspection on narrow-headed rails.

GENERAL ADAPTABILITY OF THE SERIES OR SYSTEMS OF SECTIONS TO ALL GRADES OF RAILROAD SERVICE.

Roads having a light traffic can select the stiff sections of light weight per yard, while roads having a heavy traffic must have the stiff sections, but with more metal for wear. Some roads would only need two sections of a series, while others could economically employ more. Every section has its advantages and disadvantages, and should be adapted to the general service it can best sustain. In my system of sections there is a great range of adaptability, not only because it allows a choice of sections, but also because each section permits a large range of service. The heads are broad, of large wearing capacity owing to the efficient support under the heads, are very stiff for weight of metal used, and can be made physically hard, combined with toughness instead of brittleness.

Experiments already made indicate that in physical properties the elastic limits of the steel and the per cent. of elongation in 10 in. could, for the series, be as high as follows:

	Elastic limits—in pounds.	Elongation. Per cent.
Series A	52,500 to 55,000	16 to 20
" B	55,000 to 57,500	16 to 18
" C	57,500 to 60,000	14 to 16
" D	60,000 to 62,500	12 to 14
" E	62,500 to 65,000	12 to 14

Tests of rails as nearly similar to those of series A, B and C as could be found, and which have worn well, show that it would be quite safe to adopt the above scale for rails when used in localities where the temperature falls as low as zero in winter. More extensive tests, covering a greater range of sections and manufacture, may indicate that a higher standard of physical properties can be adopted, or that some change in the contour of the sections may be required. It is the duty of the engineer to give the manufacturer a standard of physical properties desired, inviting the co-operation of the latter's knowledge in producing a metal of the desired quality.

Attention is called to the deflections shown in tests of two of the 80-lb. rails of different metal. The tests of the first were given in my previous paper.

For light loads, the first rail is the stiffest, one reason being that it is full weight, but the elastic limit of the steel in the head being only 45,680 lbs., it quickly takes a set and wears rapidly.

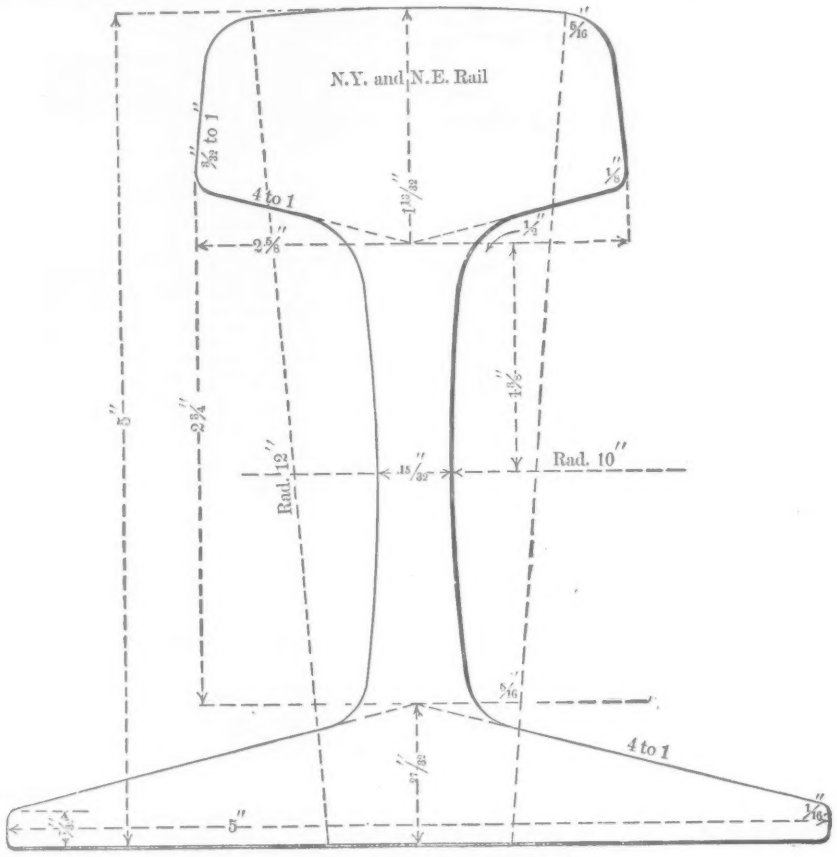


Fig. 1. New York & New England Rail.

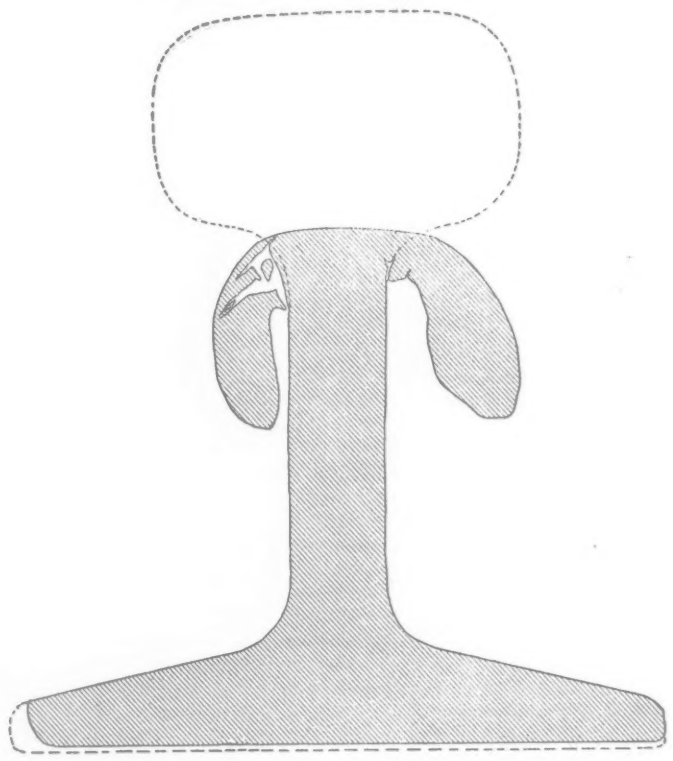


Fig. 2. Worn Rail.

The tests in this paper are of a rail with actual weight of 78 lbs. per yard, but the elastic limit is 62,400, and it does not readily take a set, as will be noticed from the tests, and as far as can be observed is wearing slowly in the track. The difference is not due to difference in sections, but difference in quality of metal.

The deflection tests, in the postscript to my first paper, of the Delano section * in comparison with the McClure section, are important, showing some difference due to the sections.

* See *Railroad Gazette*, Feb. 28, 1890.

TECHNICAL.

Manufacturing and Business.

The Automatic Interchangeable Car Coupling Co. is equipping 100 cars for the Burlington, Cedar Rapids & Northern with the Fox coupler. A number of Northern Pacific cars are also being equipped with the device.

The Ingersoll-Sergeant Rock-drill Co., of New York, has just received an order for a large plant of submarine drilling apparatus from the contractors engaged in removing the iron gates of the Danube River. The work extends for 20 miles along the Danube River, and will cost about $5,000,000. Mr. Bessier, a German engineer, recently visited this country in the interests of the work, and investigated American methods, and it is believed that the order for the machinery was placed on his recommendation.

William Sellers & Co., of Philadelphia, are now building for the Baldwin Locomotive Works' new shops two 100-ton high speed traveling cranes, each with two 50-ton trolleys, for a span of about 75 ft. and for a shop about 340 ft. long. Each crane is to be driven by electric motors on a hanging platform.

The Chapman Valve Co. is making an extensive enlargement of its works at Indian Orchard, Mass.

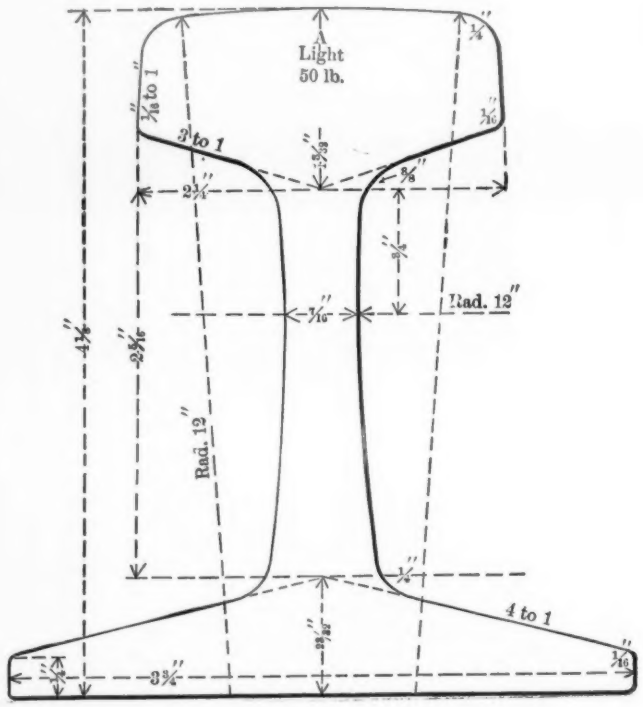
The New England Equipment Co., of Portland, Me., has been organized with a capital stock of $200,000. James M. Hall is President and Treasurer.

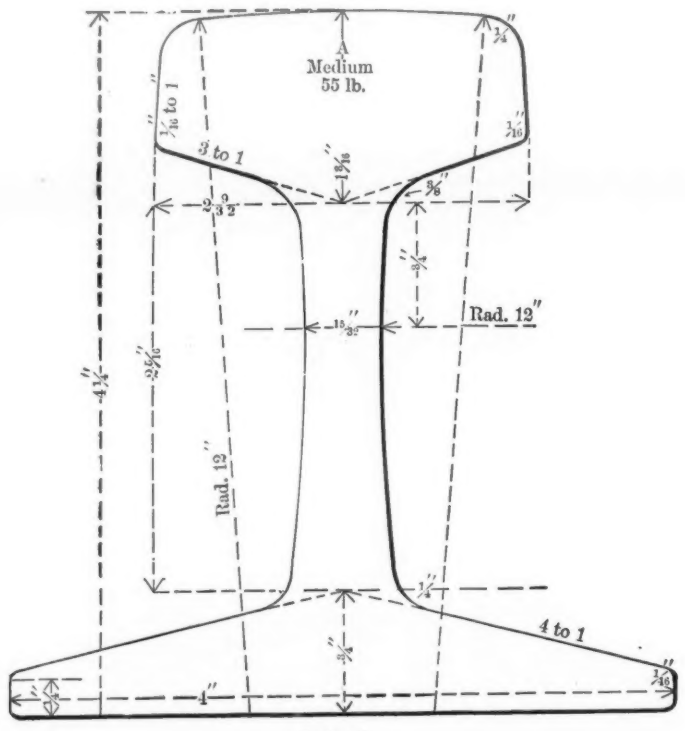
The Tyler Tube & Pipe Co. will soon start its tube and pipe mill, recently erected at Washington, Pa. The company will make its own skelp iron, having put in an 18-in. 3-high Garrison roll train for that purpose.

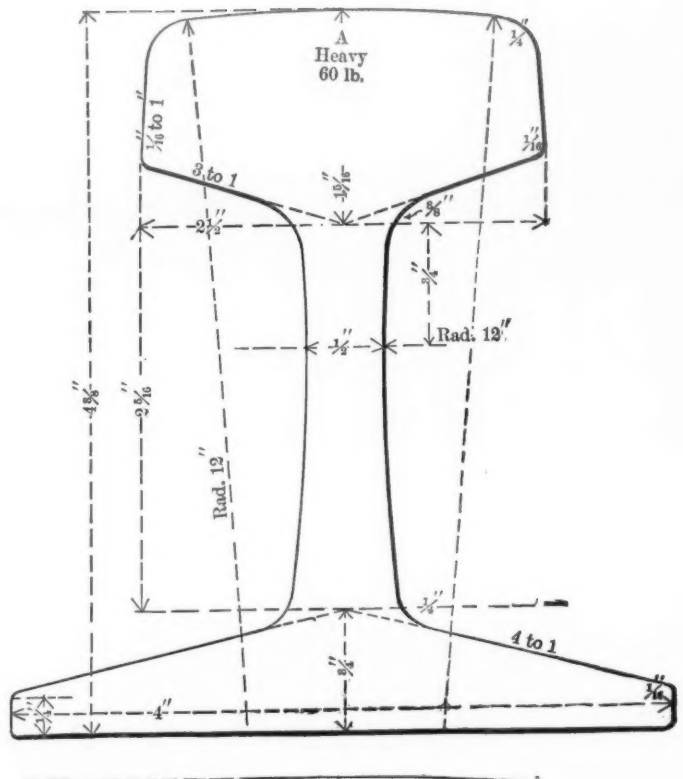
The Fowler Steel Car Wheel Co. of Chicago is now operating its works with quite satisfactory results. The works are running both day and night. Several orders have been booked, calling for 100 to 200 wheels each, and in one case a company gave an initial order for 500 wheels.

Iron and Steel.

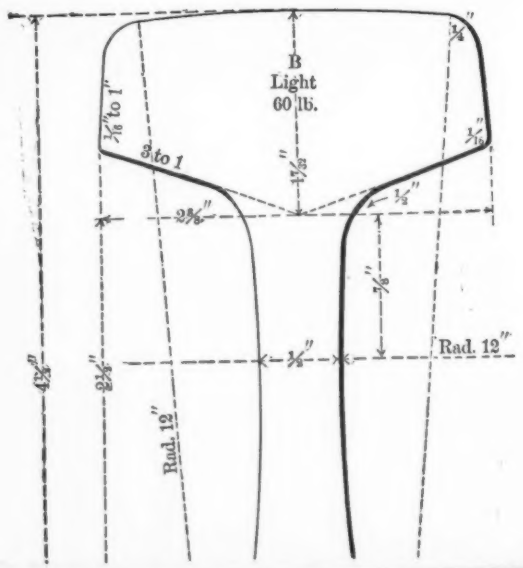
Carnegie, Phipps & Co., Ltd., of Pittsburgh, have abandoned the making of merchant steel at their Beaver Falls mills for the present. It has been found more profitable to make the merchant steel at the Upper and Lower Union Mills in Pittsburgh, instead of making it in Beaver Falls and also in Pittsburgh.

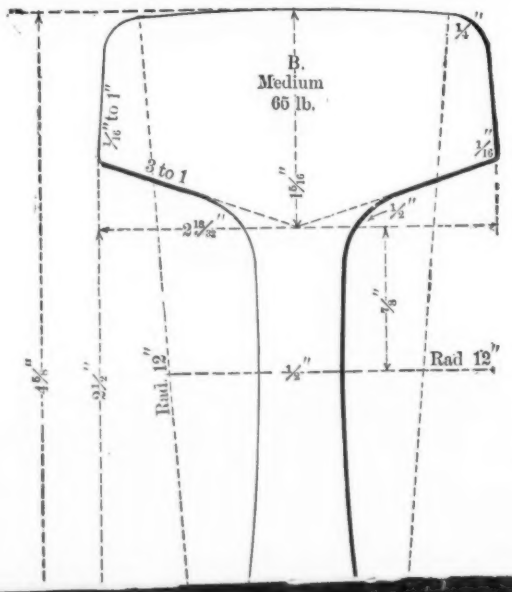

A
Light
50 lb.
3/16" to 1"
3 to 1
2 1/4"
15/32"
3/8"
3/4"
7/16"
Rad. 12"
4 1/16"
2 5/16"
Rad. 12"
1/4"
4 to 1
3 3/4"
23/32"
1/16"

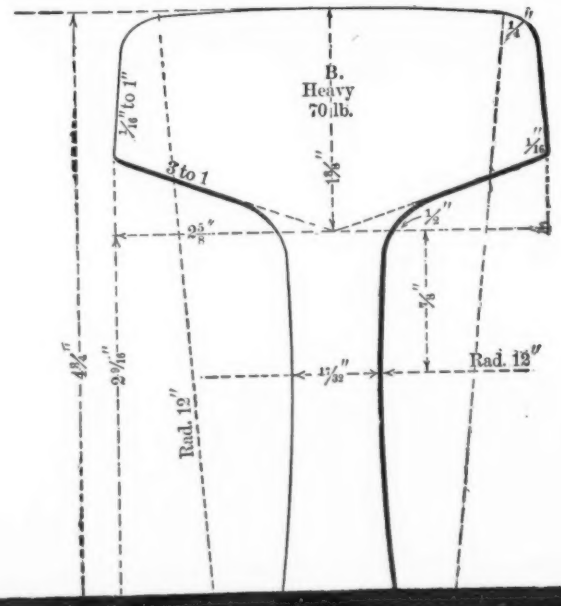

A
Medium
55 lb.
3/16" to 1"
3 to 1
2 3/32"
1 1/16"
3/8"
3/4"
15/32"
Rad. 12"
4 1/4"
2 5/16"
Rad. 12"
1/4"
4 to 1
4"
3/4"
1/16"

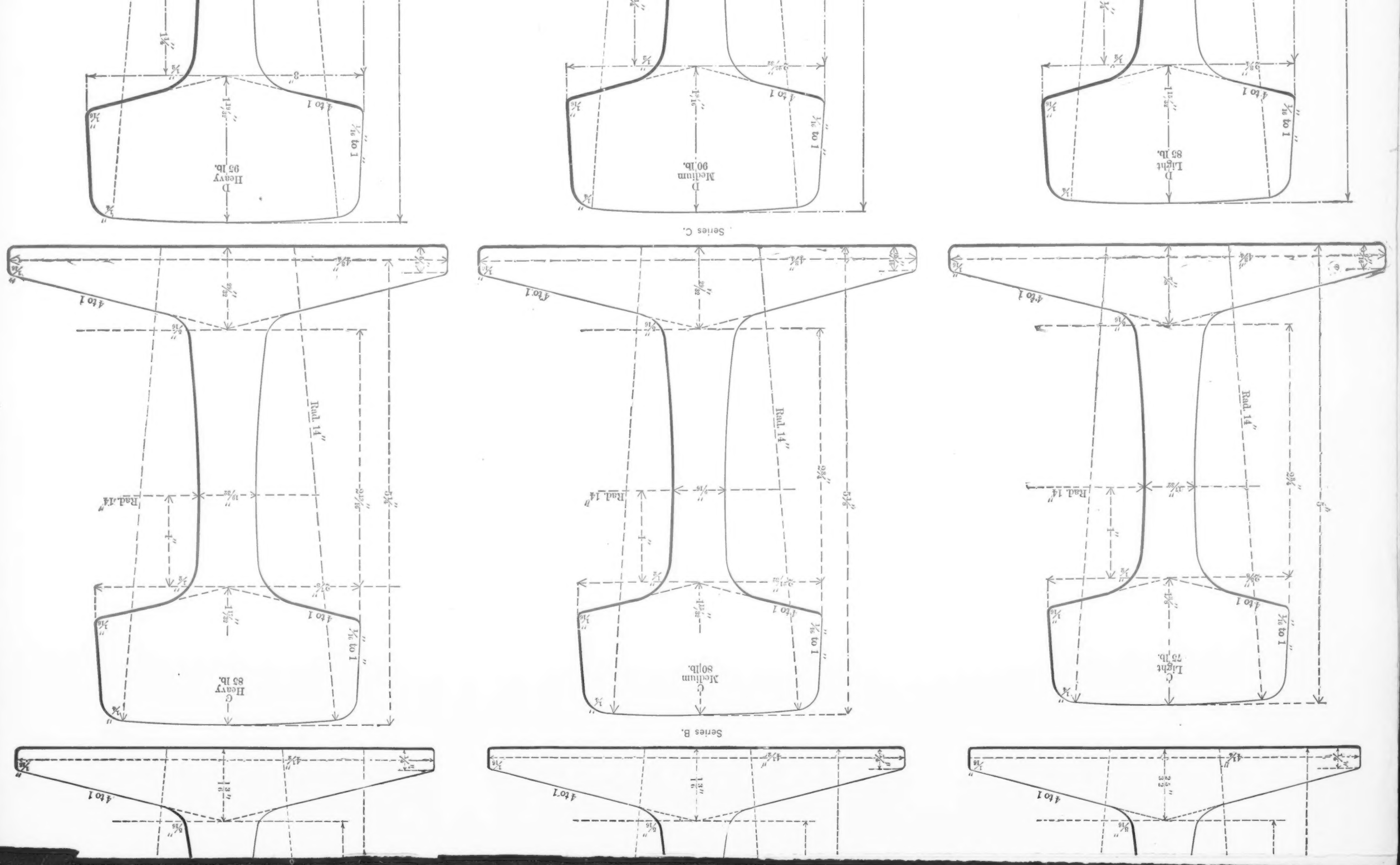

A
Heavy
60 lb.
3/16" to 1"
3 to 1
2 1/2"
15/32"
3/8"
3/4"
1/2"
Rad. 12"
4 3/8"
2 5/16"
Rad. 12"
1/4"
4 to 1
4"
3/4"
3/16"

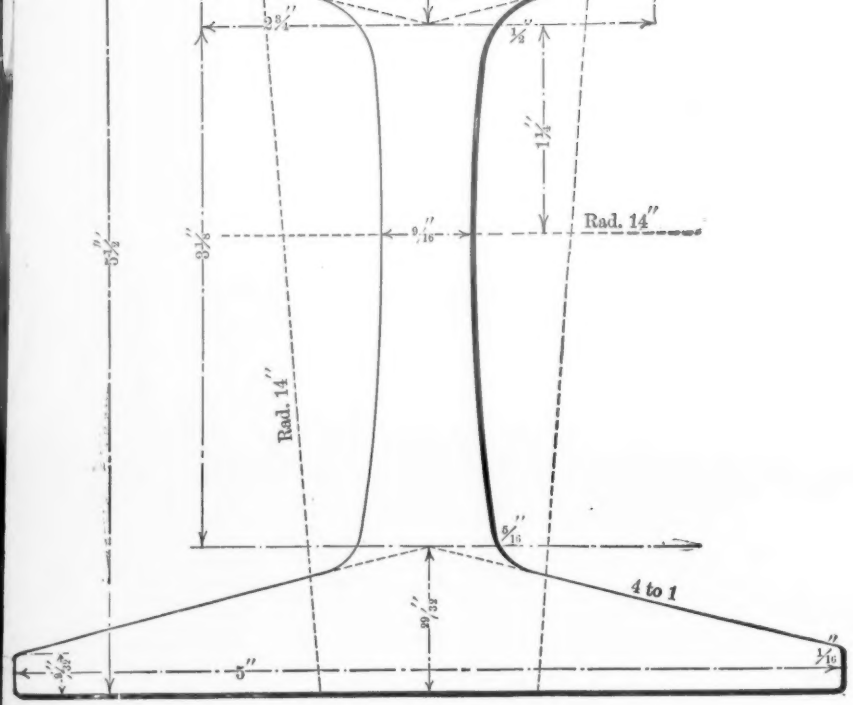
Series A.

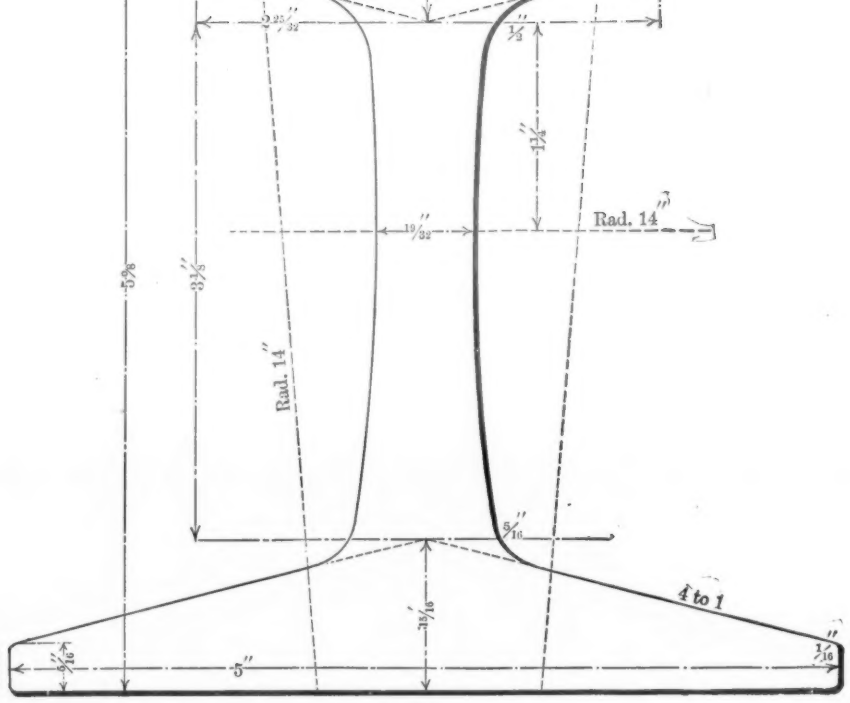

B
Light
60 lb.
3/16" to 1"
3 to 1
1 13/32"
1/2"
2 5/16"
3/8"
Rad. 12"
4 3/8"
2 5/16"
Rad. 12"
1/4"
1/16"

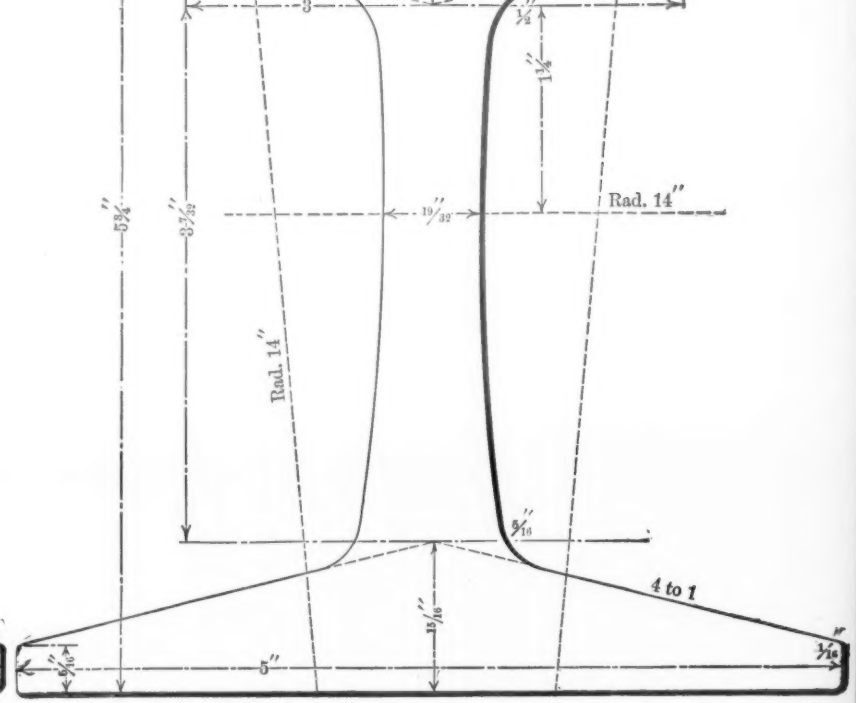

B.
Medium
65 lb.
3/16" to 1"
3 to 1
1 5/16"
1/2"
2 15/32"
3/8"
Rad. 12"
4 5/8"
2 1/2"
Rad. 12"
1/2"


B.
Heavy
70 lb.
3/16" to 1"
3 to 1
1 5/16"
1/2"
2 5/32"
3/8"
Rad. 12"
4 7/8"
2 5/16"
Rad. 12"
1/4"
1/16"

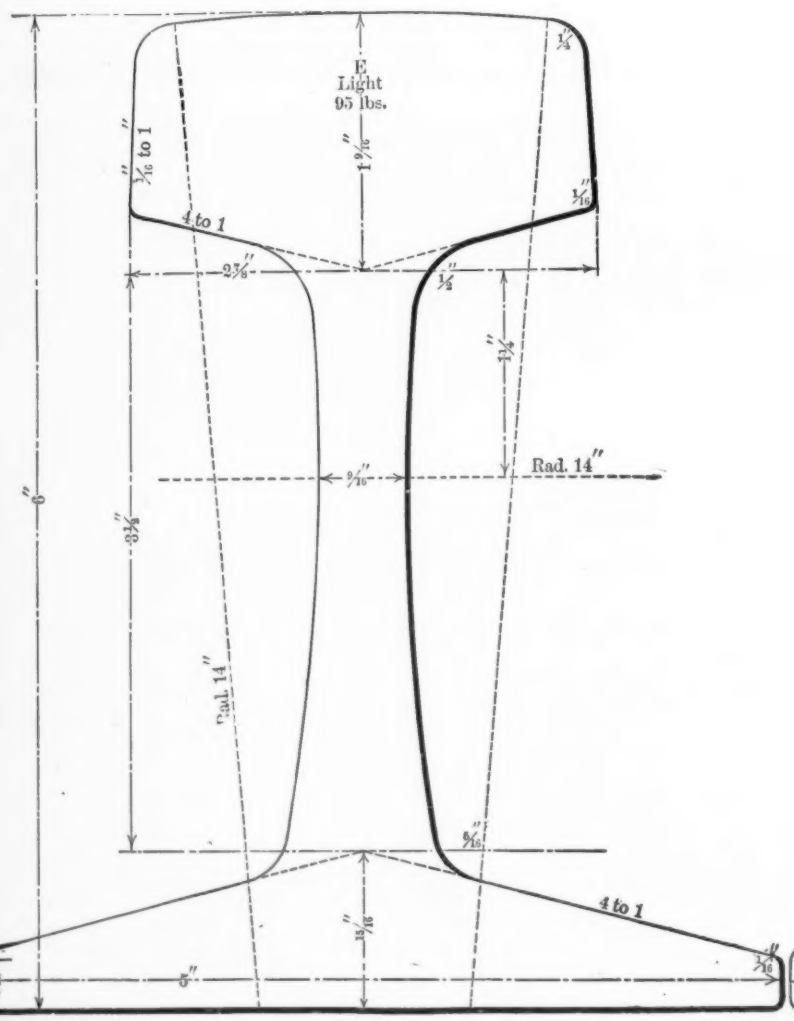

Series C.
D
Heavy
95 lb.
D
Medium
90 lb.
D
Light
85 lb.
C
Heavy
85 lb.
C
Medium
80 lb.
C
Light
75 lb.
Series B.
Rad. 14"
4 to 1
1 to 1
4 to 1
1 to 1
4 to 1
1 to 1

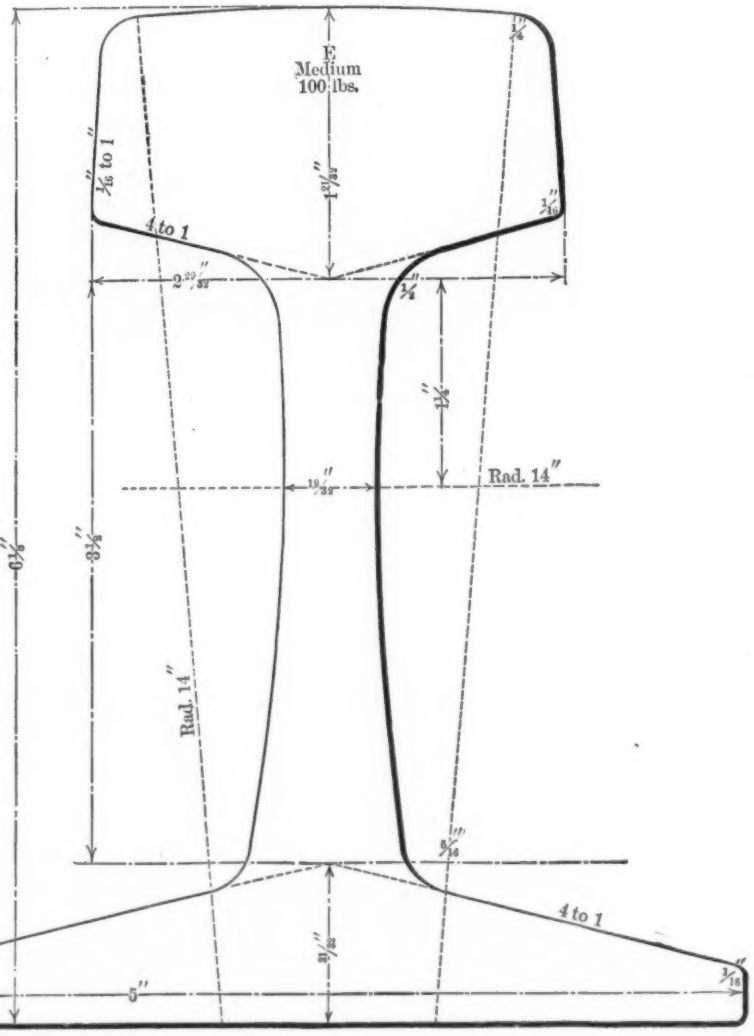


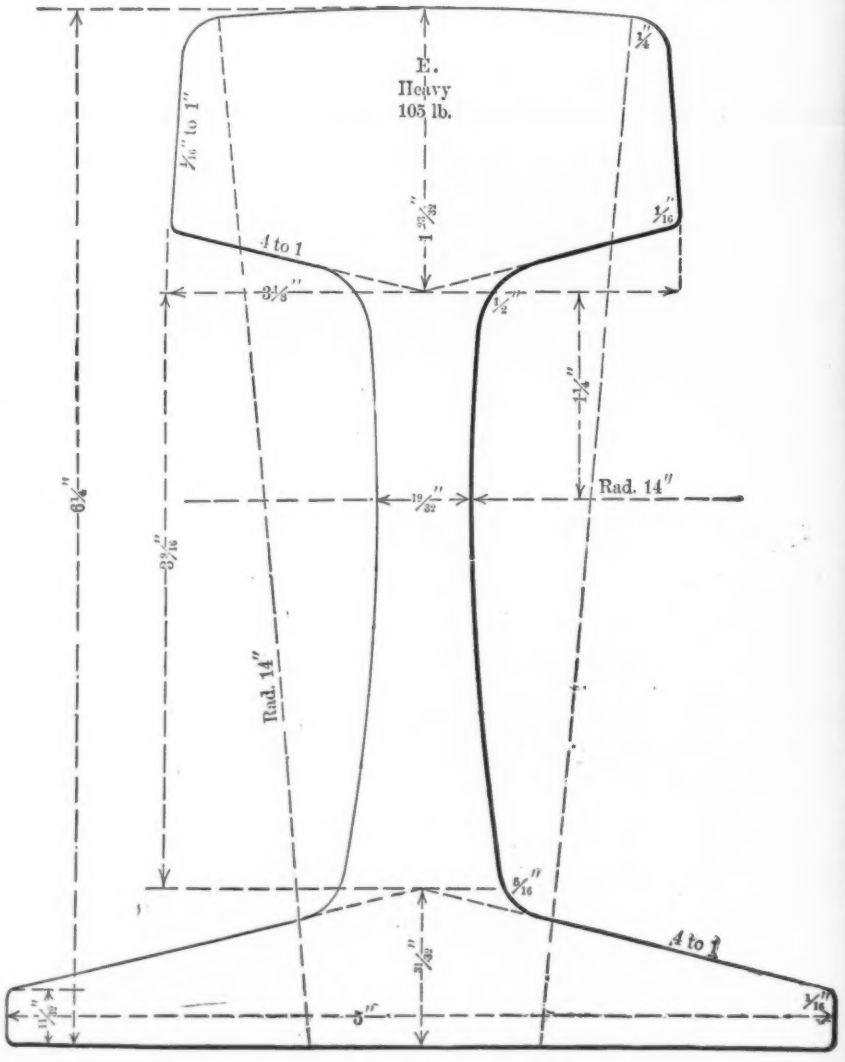




Series D.

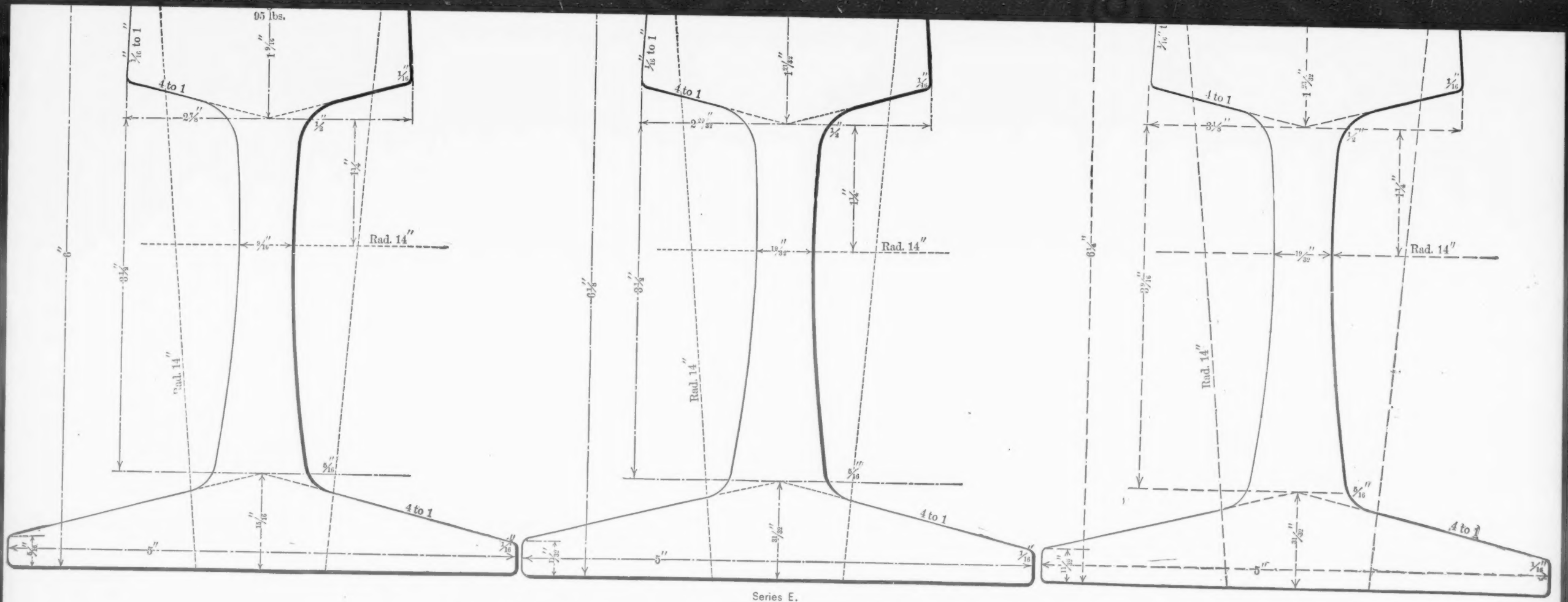






Series E.

FIVE SERIES OF STANDARD RAIL SECTIONS, PROPOSED BY MR. P. H. DUDLEY, C. E.



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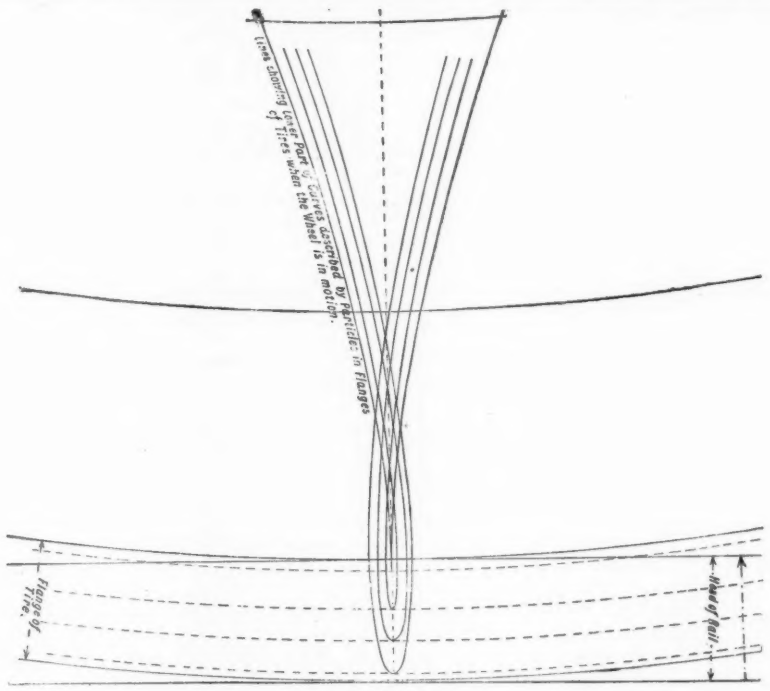

Fig. 3. Cycloidal Curves.

The Sharon Iron Co. has been made a limited company. C. H. Buhl, of Detroit, is President; F. H. Buhl, of Sharon, Pa., Treasurer, and D. Adams, of Sharon, Secretary. The firm name now is the Sharon Iron Co., Ltd.

The casting of the first large lathe of the number to be used in turning the immense new guns for the United States Navy was accomplished at the Pond Tool & Machine Works in Plainfield, N. J., recently.

The Chester Rolling Mills, of Chester, Pa., will hereafter be known as the Wellman Iron & Steel Co. The stockholders will also vote on a proposed increase in the capital stock.

The Shenandoah Furnace Co., of Shenandoah, Va., has increased its capital stock from $250,000 to $500,000, and will begin the erection of a merchant mill as soon as possible after approval of plans.

The Steel & Iron Improvement Co., of Pittsburgh, is erecting an experimental furnace in the Black Diamond Steel Works of Park Bro. & Co., Limited, in that city, for making steel direct from the ore by the Adams process. The process is controlled by the first named company and has been tried at the works of the Premier Steel Co. at Indianapolis, Ind., with what are claimed satisfactory results.

The Lawrence Rolling Mill, at Ironton, O., will shortly be removed to Glasgow, Va., where it will be operated by the Glasgow Rolling Mill Co. The company will have a capital stock of $200,000. George T. Scott, of Ironton, is President of the new company.

The Minnesota Iron Co. is building a new machine shop at Tower, Minn. The machine department will be 80×45 ft., the blacksmith department 60×45 ft., and the carpenter department 72×45 ft., with solid fire walls separating them.

The Ries Electric Traction Increaser.

A company has been formed at Baltimore, Md., for the purpose of manufacturing and applying the apparatus used under this system, which has been referred to in previous issues of the *Railroad Gazette*. We understand that an engine is being fitted up at the Mt. Clare shops of the Baltimore & Ohio in Baltimore, and that a trial is soon to be made. The dynamo, which is of the alternating current type, is placed upon the top of the boiler midway between the dome and the smoke stack and is operated by a rotary engine, which is placed alongside of it and connected by a pipe with the dome, whence steam is taken.

One or both pairs of driving wheels are electrically insulated from the frame of the locomotive and from each other by the use of special insulation surrounding the driving box and side rod brasses. The insulation so far employed has behaved well and tests made after several months of continuous service have led to its permanent adoption. Electrical connection with the two pairs of drivers is maintained by means of brushes bearing upon brass sleeves secured to the central portion of each driving axle. These brushes are connected, by means of copper conductors, with the source of low tension current, which is a transformer placed in proximity to the main driving axle.

As the resistance of the traction-increasing circuit is practically constant under given track conditions, the flow of current is usually regulated by varying the electro motive force, which, on account of the low resistance of the circuit and multiple connection of the driving wheels, can be kept very low. The current density at the points of contact between the driving wheels and rails can be varied at will, according to the percentage of increased adhesion desired, the usual range being from 500 to 2,500 ampères.

It is proposed to use part of the current generated by the dynamo for the operation of electric locomotive and train brakes, electric headlight and train lighting, etc., in addition to its use for increasing traction. The dynamo is generally kept running at a low rate of speed when not otherwise employed, and is so constructed as to respond automatically to any increased demand made upon it up to the limit of its capacity.

Track Inspection with the Dynagraph Car.

Mr. P. H. Dudley has recently returned from an examination of the lines of the Queen & Crescent system. The examination was made with the dynagraph car, and low places were marked with the spotting apparatus, as is customary in Mr. Dudley's well-known inspections. The spotter was set to mark deflections of ¼ in. After repeated markings and when track has been brought up to a very high standard it is Mr. Dudley's rule to set the apparatus to mark deflections of $\frac{3}{8}$ in. The lines inspected on the Queen & Crescent system aggregated 1,200 miles of single track. The running time was 13 days. The diagrams obtained will be printed and distributed for use of the track department, as is customary. An interesting incident of this trip was that for a short distance the run was made over English iron laid before the war. These old rails are 18 ft. long.

New Cars of the D., L. & W.

The Delaware, Lackawanna & Western has received part of the new vestibule cars which the Pullman Company is building. The cars received are two parlor and two baggage cars. They are painted the standard color, dark green, the baggage cars being decorated with gilt scroll work. The interiors of the parlor cars do not differ materially from the general run of that class of cars built by the Pullman Company, excepting that the smoking room is reached from the aisle by two doors at right angles with each other and is entirely closed off from the main body of the car. The chairs and settees throughout are covered with white hair cloth instead of plush, which can be easily wiped off and kept clean. The baggage cars have brass fixtures for the use of lamps, while in the parlor cars the gas fixtures of the Pintsch system have been put in.

The gas is obtained from the plant of the Safety Car Heating & Lighting Co. on River street, Hoboken. The Gold system of steam heating similar to that in general use by the company is used. The trucks have each six 36-in. paper wheels made by the Allen Paper Car Wheel Co. The six-wheel brake application adopted by the Pullman Company is used.

Eight passenger cars are expected soon. When they arrive two trains will be made up, each consisting of four coaches, a parlor and baggage car, and will be run between New York and Buffalo as the day express.

Interlocking.

The Johnson Railroad Signal Co., of Rahway, N. J., is putting in an interlocking plant, with a 57-lever machine, for the Manhattan (Elevated) road at 159th street, New York City, the northern terminus of the Sixth avenue line. The same company is putting in interlocking plants for the New York, Lake Erie & Western at Hawthorn and Waldwick, on the Eastern Division.

The Cyclone Plow.

A controlling interest in the Cyclone Snow Plow has been purchased by Mr. C. P. Jones, of Minneapolis, Minn., who will devote his attention to the development of this machine. One plow is to be built immediately by the Northern Car Works in Minneapolis.

An Italian Cable Railroad.

A steep cable railroad has lately been built up the slopes of Monte San Salvatore, near the Lake of Lugano. The power for working is obtained from a stream in the vicinity, and is transmitted electrically to the operating station half way up at Pazzallo. The water is led through a long iron pipe to two Girard turbines. To each turbine there is coupled direct an Oerlikon dynamo. One dynamo is a continuous current machine, and is employed to transmit the power required for the railroad, and the other is an alternater, which serves for the supply of current for lighting the town of Lugano and the stations of the cable railroad. The railroad line starts a little above the level of the Lake of Lugano, and passes through Pazzallo to the summit of the mountain, the gradient varying from 17 per cent. to 60 per cent. The total length is a little over a mile. The electric current on arriving at Pazzallo is converted into ordinary tractive power and moves the endless cable.—*Industries.*

THE SCRAP HEAP.

Notes.

A dispatch from Santa Fe Aug. 5 stated that all the sectionmen on the Atchison, Topeka & Santa Fe between Las Vegas and Albuquerque had struck for an increase of 15 cents a day on their pay, which was $1.10.

A dispatch from Tucson, Ariz., Aug. 7, stated that extensive washouts had stopped all traffic eastward from that city for five days, and that there was also similar trouble to the westward, the damage to the Southern Pacific Co. being many thousand dollars.

There will be no more card playing in the drawing-room cars on the Long Island road, according to an order recently issued by Vice-President Norton. Frequent complaints by ladies led to an investigation, and it was decided to put a stop to the card playing.—*Exchange.*

The yard trainmen of the Evansville & Terre Haute at Evansville, Ind., struck last week and left uncoupled trains standing on the main track, delaying many passengers a long time. Freight traffic was stopped for 24 hours, when the company advanced the wages as demanded.

The Louisville & Nashville, after conference with a committee of conductors, agreed with them last week upon a scale of wages and rules of procedure, after the manner pursued by many roads in dealing with locomotive engineers. Local freight conductors had their pay increased from $80 to $85, through freight conductors from $2.70 to $2.75 per trip, certain other freight conductors from $78 to $85, and some local passenger conductors the same. Others were increased from $80 to $90. Work train conductors will continue to receive $90 per month at present. There will be no change in the delayed time schedule; the "two hour system" still remains in force. Conductors when "deadheading" will receive full pay for the time consumed. Conductors who are attending court as witnesses for the company will receive the same pay as their runs would make during the time they are off. Regarding the investigations clause on charges, a conductor, if found innocent, will receive full pay for all time lost pending the investigation, and no punishment is to be inflicted without a thorough investigation which, if possible, will be held in five days.

Valuable Information.

The Richmond & Danville road has placed a contract with Schall & King, of York, Pa., for 200 locomotives.—*Am. Journal of Railway Appliances.*

Quick Locking at the "Soo."

Colonel Poe seems to have taken every precaution necessary for the rapid transmission of the fleet of nearly 200 vessels which were gathered about the lock in the 88½ hours during which the traffic was suspended. Tugs were sent to meet the vessels and note their times of arrival, so that each should go through in its order, and when the canal was opened 84 big carriers were passed in the first 24 hours.

The traffic through this canal is larger, as our readers know, than that through the Suez Canal, though traffic is suspended during five months; and during the seven months the lock is in operation the tonnage passing through it is about $\frac{1}{7}$ of the foreign commerce of the port of New York. The July supplement to the Inland Lloyd's Register shows that the tonnage on the lakes has increased during this year by about 9 per cent., aggregating 832,588 net tons, valued at 56⅔ million dollars, the increase in value for the half year having been nearly at the rate of 13 per cent.

Railroad Projects in Syria.

According to a recent British Consular report from Syria, projects for the construction of railroads there are numerous. Now that the port of Beyroot is being improved by a French company, those interested in its success have been much disturbed by proposals to construct railroads from Tripoli and Caiffa. These proposals, or either of them, if carried into effect, would diminish the importance of Beyroot as a commercial centre, and would materially lessen the revenues of the port company. Consequently a third railroad from Beyroot to Damascus and the Hauran over the Lebanon range has been projected. But the cost of this undertaking, entailing as it does the tunneling of the Lebanon range, would be so great that it must be regarded rather as a political than as a commercial enterprise. None of these projects have passed beyond the initial stage.—*London Times.*

The Block System on the Erie.

The block system is to be put in force on the third division of the New York, Pennsylvania & Ohio, from Kent to Galion, O., 92 miles. The blocks will average about five miles long, and it will be necessary to erect at sidings on this division, where there are now no telegraph stations, five block towers and establish five new telegraph offices. The work will be commenced at once, and it is thought the system will be in operation within 60 days.

The Delagoa Bay Railroad.

In compliance with the request of the British, American and Portuguese Ministers at Berne, President Ruchonnet, of Switzerland, has appointed a commission of three Swiss jurists to fix the amount of the indemnity which Portugal shall pay for seizing the Delagoa Bay Railroad.

Strikes in Great Britain.

The strike in South Wales, which paralyzed the whole of that country, has been organized in a manner which offers an interesting example of the present trades union methods. There are two points at issue. The dock strike at Cardiff is the usual attempt to enforce the absolute supremacy of the union by prohibiting the employment of non-union men. The railroad strike turns on the question of pay, or how pay shall be calculated. The men want shorter hours, indeed, but only in order that overtime pay at higher rates may begin sooner. There ought to be no great difficulty in arranging the matter. The railroad directors at first refused to deal with the unionist officials not connected with their road. Then they gave way, and came to terms with Mr. Harford, General Secretary of the Amalgamated Societies of Railway Servants. Their negotiations with him ended in the concession of nearly everything the men demanded. An agreement was drawn up, and Mr. Harford reported the result to the men, who thereupon repudiated his agreement. The whole matter in dispute is about ten hours pay per month. But if the strikers refuse to be bound by their own representatives, it is difficult to see how any bargain can be made.

South Wales in the meantime is helpless. Railroad travel is entirely stopped. Neither freight nor passenger trains can be moved. The mails are sent by cart. Business at Cardiff is at a standstill. Ships lie idle. Collieries are closing because the coal cannot be carried, and food is obtained with a good deal of difficulty. The police are in some force and the military have been sent for. Intimidation, under the name of picketing, is practised, as usual, on a great scale; and as usual without interference from those whose duty it is to protect men wishing to work. The professional agitator is on the spot. South Wales seems very much at the mercy of Mr. Ben Tillett, another unionist official.—Correspondence New York *Tribune*, Aug. 10.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The New York Central Strike.

During the past week travelers, shippers and an important railroad have been put to great inconvenience and many thousand dollars loss, and a number of good workmen were suddenly thrown out of their situations by a very foolish strike. For some weeks trouble has been brewing on the New York Central & Hudson River. A number of men have been discharged, the officers of the road have refused to reinstate them on the demand of officers of the Knights of Labor, and last Friday night enough trainmen and yardmen "went out" to badly delay traffic for some days. So far as can be judged by the facts made public, the case of the men was very weak, and they were entirely unjustified in drawing an innocent and unsuspecting public into their quarrel. The most conservative daily papers have scored them unmercifully for the injury and even suffering they have inflicted on passengers, and the strong statements made are not contradicted. "An indecent disregard for the opinion of mankind" was manifested in the failure to warn the public, and public sympathy is wholly lacking. These men were not striking for more pay or less work, but simply to enforce the authority of their leaders. Besides having a bad cause, they used poor judgment, as is evidenced by the motley character of their membership. No one class of employés took an enthusiastic or controlling part in the movement, and the whole body was so scattered as to waste its strength. It does not appear that the men who were discharged, and whose reinstatement was demanded, were or were not fairly competent and reliable employés. In fact General Manager Toucey plainly avows that they were dismissed on account of their mischievous disposition. That they were assiduous in cultivating discontent is not, we believe, denied.

Now, if a man undertakes to disorganize the working staff of a railroad he takes his fortunes in his hands, and if he gets discharged he is a martyr in the cause of labor may be, but he cannot expect to be forgiven and taken back. The discipline of a railroad must be high. That is imperative; but discipline cannot be kept up if employés are allowed to run about speaking evil of the company and its officers. A loud mouth is as good reason for dismissal as a clumsy hand or a stupid head. A strike for better wages or for amelioration of given conditions often enlists public sympathy and is generally successful, in part at least. The recently published statistics of the Bureau of Statistics of Labor of the state of New York confirm this in a remarkable way. Of all the strikes in five years, 47 per cent. were successful and 15 per cent. were compromised. Of the wages strikes and strikes for and against changes in hours of labor 54 per cent. were successful and 18 per cent. were compromised. Of strikes against discharge of union men and others of this class 34 per cent. were successful and 27 per cent. were compromised. It will be seen that the chances are against the success of a strike brought about as was that on the New York Central. In this instance not only was public sentiment against the strikers, but almost from the first we found among railroad employés a pretty general sentiment that the strike was unwarranted and sure to fail.

Some railroad managers, in commenting on this strike, have said that the fight might as well come now as at some time in the future, since it was inevitable. In view of the well-known history of the Knights of Labor, we can hardly agree with this. The fortunes of the "Order" are waning and it is not certain that a fight was inevitable. The case is not parallel with the Burlington struggle of 1888. But whether this fight *should* have been avoided or not, there is much strength in the view, freely expressed by railroad men as well as the press, that it *could* have been avoided by the same tactics that have been employed many times before. As will be seen by details printed in another column, the final deadlock may have been a mere quibble in words. It was on the question as to *what men* the negotiator represented. He said, "the Knights of Labor." That is a body which a railroad manager is not bound to deal with; but if the man had said "I have come at the request of certain of your employés," as the leader of the Locomotive Engineers comes to railroad officers all over the country and as he has doubtless come to the Central's officers many times, Mr. Webb would have been bound by well-defined precedent to receive him. It is doubtless true that the demands which these disaffected men wished to present were unreasonable, but was it not simply a question of a little waste of time by a railroad officer in hearing and answering them? The writers of the daily press argue that a railroad stands between the public and its employés and therefore should endeavor to have differences arbitrated; this means, in effect, that railroad managers should exercise unlimited patience, regardless of foolish or irregular methods pursued by their employés; and the argument is not without weight. Whatever may be said concerning the abstract right of employés to present their grievances through an outside party, there is little doubt that practically it will have to be recognized sooner or later. Labor organizations *per se* are too popular to be ignored. If railroads treat a strong organization with an adroit leader better than they do a weak one with an unskillful spokesman, they injure themselves with all fair-minded critics. Of course when this strike finally came there was but one safe or dignified course to take—to resist it. It was one of the cases that cannot be arbitrated or compromised, for it was not a case of wages or work, but of discipline; and Superintendent Voorhees' brief manifesto was exactly to the point.

The New York *Evening Post* demands a criminal law to punish such wanton disregard of the rights of the public. Such a remedy would doubtless be just in the abstract, but aside from the question of the possibility of passing such a law and the harder one of enforcing it if enacted, it seems a pity to adopt force when diplomacy is yet so far from being exhausted. It is said, with truth, that the time to arbitrate disputes is before men strike instead of after; but when ignorant or excited employés in their blindness miss the path to an amicable settlement, it is the moral duty of their more experienced and educated employers to give them friendly aid. The president of the New York Central, in a recent speech at New Haven, approved of employés' organizations, and he was speaking of a secret one at that. In this he was right and the best railroad managers agree with him; but if it is well to have employés organized, so that they can better be dealt with collectively, the theory, logically carried out, demands that railroad directors should try to regulate or improve such organizations, where they are vicious, instead of attempting to kill them out.

Safety Chains.

Aside from the question of the usefulness of any sort of safety chains between passenger cars, it is evident that when they are used they ought to be strong enough to hold the train. The opinions of railroad men seem to be about equally divided for and against the use of safety chains; but if to those who do not favor them were added those who are using chains which are of no value, there would be a large majority against them. It is a strong argument against the use of safety chains that hundreds of cars are now running and building with safety chains wholly inadequate to perform the functions for which they are intended. A connection of this sort can do more harm than good if it cannot fulfill the object for which it is designed. Locomotive builders have long since found this out, and numerous instances are known where firemen have been killed by dropping between the engine and tender in cases where the drawbar was broken and the safety chains failed to hold. A few years since, when heavier locomotives were being introduced, much trouble was experienced from the breaking of the couplings between the engine and tender, due to the use of too small drawbars and the lack of flexibility in the joints at their ends. In some cases the breakage was caused by the use of an inclined drawbar for the purpose of transferring a part of the weight of the tender to the drivers when the locomotive was pulling hard. This resulted in a twisting action on the pin connection and brought about breakages which taught many lessons regarding the strength and the value of safety chains.

Between engines and tenders of the old types there were two safety chains made of $\frac{3}{4}$-in., round iron, and it was a surprise to many to find that such chains were not of the least value, and would snap without any apparent retardation of the engine, which, of course, instantly shot ahead after being released from the tender. Gradually the size of the iron was increased until $1\frac{1}{4}$-in. iron has been used, with very large eye-bolts at the ends—in many cases 2 in. in diameter. It was found that chains as large as $1\frac{1}{4}$ in. and eye-bolts $1\frac{1}{2}$ in. in diameter would be broken, if there was much slack, with heavy locomotives. Some car builders and other railroad men say that they never have known a case where safety chains held the train after uncoupling. This belief, of course, cannot accord with the facts because the strains upon the chains depend largely upon the pull of the locomotive at the time of uncoupling, and in cases where the locomotive is not pulling hard the safety chains are not always over-strained.

As this subject is now before the Master Car Builders' Association for letter ballot, a little discussion may be of advantage, because it will be apparent to many of the members, if not to the majority, after a re-consideration of the question that the size of the chain offered for letter ballot, namely, $\frac{7}{8}$ in., is too small to be of any real value in the case of a break-in-two in a heavy train.

This is a subject to which it is difficult to apply mathematical calculation, but a satisfactory approximate result can be arrived at with a very few figures. An exact solution would require consideration of the elasticity of the material in the chain, the connections at the end of the chain, the end sills, the drawbar springs, and any springs that might be placed back of the safety-chain eye-bolts. Also it would necessitate an allowance for the inertia of the rear of the train considered by individual cars. This would be a most difficult problem, and one of which an exact solution would be impossible. An approximate solution can be made directly, the results of which will not vary greatly from the exact stresses if they could be obtained. Such an approximation is closer than that obtained by the calculations used for many details of locomotives and cars.

Multiply the hauling force of the locomotive, measured at the contact between the wheel and rail at the time the train breaks in two, by the amount of slack in the safety chain in feet. Divide this by an estimated stretch of all of the safety chain connections, also in feet, before the front of the train would be reduced to the same speed as the rear. The result will be approximately the average stress on the safety chain during the period in which the front of the train is being slackened to the speed of the rear. This average stress is about one-half of the maximum stress which will exist in any particular case. Such a strain as this is to be considered as suddenly applied. Therefore, the pull on the chain ought to be considered as at least twice this calculated stress; hence, the actual stress would be approximately four times the average stress found as above. In an assumed case, not an unusual one, where the hauling force of the locomotive is 10,000 lbs. and the slack in the safety chain and connections 6 in., and the stretch of the connections 2 in., which is large for cases where there are no springs back of the safety-chain eye-bolts, and is about right where such springs are used, particularly if of rubber, the calculation now becomes $4\times 10{,}000 \times \frac{1}{2}$ divided by $\frac{1}{8} = 120{,}000$ lbs.

It is true that this stress would not exist if the break-in-two was near the rear end of the train. Then it would be much less, and these figures only apply to a break between the first two cars of a long train: and while they may seem large, yet it must be remembered that the stresses have often been sufficient between a locomotive and tender to break double chains of $1\frac{1}{2}$ in. iron. Right here there is another point which is pertinent. It is with reference to the uniformity of the tension on the two chains. There may be a different amount of slack in the connections, such that one chain will do nearly all the work until it breaks; then, of course, the strength of the

connection is measured by one chain. The angularity of the cars on curves produces a similar result. Even when hooked into corresponding links, it is not safe to assume that the resistance to breaking is measured by more than one chain, but in cases where springs are used back of the safety-chain eye bolts, the stresses will be more nearly alike up to the point where the springs are fully compressed.

A large factor of safety should be allowed here the same as in locomotive boilers, bridges and similar structures where danger to life is great. It is customary in those to allow a factor of safety of not less than five; four is as small as should ever be used. Now in the case of the ¼ in. safety chain offered for letter ballot, the following shows its strength and value as a connection between cars: The diameter of the iron is ¼ of an inch; its ultimate strength is about 50,000 lbs. per sq. in.; the strength of a chain with round links, without studs, of this size is about 38,000 lbs. with a gradually applied load. With a suddenly applied load it would probably break at 19,000 lbs., which seems reasonable. With a factor of safety of four this chain is good only for about 5,000 lbs., and in any structure where safety of life and limb depended upon it, that strain is all that any constructor would allow for a suddenly applied load.

From this it may be seen that a ¼-in. chain is wholly inadequate to do the work required of it as a safety device between the cars of heavy passenger trains. It may be argued that in two-thirds of all the uncouplings the ¼-in. chain would hold; but if it is to be used as a safety device it should be strong enough to hold in any case, particularly as the greater number of breakages of couplings will take place in the front of the train where the strain is greatest. A similar calculation made for the eye-bolts generally used will show them to be of little value in the case of a breakage in heavy trains, and their dimensions should be correspondingly increased.

This is not an argument against safety chains in any sense of the word, but is merely an endeavor to throw some light on the subject. The calculations are only reasonable, and do not show maximum results, such as could be obtained by assuming the heaviest class of service and the conditions therein existing; and while the inadequacy of the chains as here shown may seem surprising and perhaps difficult to believe, yet a reference to the service of the chains between the engines and tenders in common use, remembering meanwhile that there is but little difference in the stresses at that point in a train and those between the first and second cars of a very long train, will furnish sufficient proof to establish the facts set forth above.

Under Control.

The phrase "Under control," when used in relation to the speed of a train, undoubtedly means under *complete* control, and should be so interpreted. An engineer can see a certain distance ahead of him, ranging from six feet or less in a London fog to three or more miles on a straight line in a clear day. If there is a car or a man on the track, a switch wrong, or a landslide covering the rails at any point within this visible distance, he must, if running under control, estimate the length of track between the cow-catcher and the obstruction, and regulate his speed so as to stop before doing any harm. If he is on a sharp curve, running through a deep cut, where he can see only 500 ft. ahead, he must run so that he can stop within 500 ft. after he applies the brake, and must keep a constant lookout and apply the air the instant he sees an obstruction. If running a hand-braked train he must make the proper additional allowances. On the other hand, If on a very long tangent he may run 75 miles an hour and yet have his speed under perfect control. If, however, there are switches in the track which are unprovided with targets and so located that he cannot see the position of the rails until he gets within 500 ft. of them, he must reduce his speed sufficiently to be able to stop after he sees the switch rail and before he runs upon it. If he is running alongside another train where smoke or steam from the locomotive may suddenly obscure his view, he must reduce his speed accordingly. If a snow storm is of an intermittent nature, so that he can part of the time see half a mile ahead and part of the time only 100 ft., he must give the rule the benefit of the doubt. There are numerous intricacies in carrying out this rule, as may readily be seen, and we cannot stop to note them all. Yet it must be acknowledged that "under control" means what it says. An engineer may perhaps say that it is impossible to make time and yet run under control at all points where that is required, and he may be able to present other practical difficulties; but a clear distinction should be made between varying the practice to fit the difficulties met with, and twisting the language to try and make it mean something which it does not.

The foregoing statements are of the most elementary nature, and so very simple and self-explanatory that at first sight it may seem to be a waste of paper and of the reader's time to rehearse them; but many circulars and time-tables are worded in language which shows a misapprehension of the term referred to, and many locomotive runners have confused notions about it. It is observable also that collisions, though generally slight ones, are frequently occurring under circumstances showing that much misapprehension exists concerning this term. The latest instance we have noted is brought out in a law suit before the Supreme Court of Illinois, reported in our law column recently, in which an engineer seems to have run over a switch of which the target was hidden from his view, and yet who convinced the court that he was "running under control." The fact that he was running very slowly seems to have been taken as convincing evidence that he had his speed "under control." If a half dozen infants were playing upon the track immediately ahead of the train it would obviously be reckless to run even at three miles an hour, but the court apparently did not see the distinction, and left the case to the tender mercies of the jurymen who, doubtless, succeeded in making confusion worse confounded when they tackled it.

As long as *any* feature of the track, affecting its safety for the passage of the train, is not clearly discernible, the portion of the line thus obscured must be regarded as unfit to run over, unless information to the contrary is given by track-walkers or other responsible persons. It is true that this construction of the rule will sometimes impose very annoying restrictions upon traffic, as in such a case as that at Thaxton's, Va., a year ago, where a train running at night was wrecked by a washout, which probably could not have been discerned from the cab window, even if the engine had been standing still; but what is the alternative? The only reasonable attitude to take is to admit that running completely under control is often out of the question, so far as night traveling is concerned, and that track-walkers are necessary. Both in circumstances of this kind, and in everyday operations in yards and other obscure places where speed has to be reduced, but yet where a strict observance of the rule would involve intolerable delays, the facts should be clearly recognized, and engineers plainly told how and in what degree they are to depend upon others than themselves for a clear track.

Some one has said recently that engineers "take chances" as badly as they ever did, and that this kind of disregard of regulations is the hardest to detect and punish. This being true, it is well to remember that employés are encouraged to take chances when they see railroad superintendents and railroad lawyers so easily misled by the careless use of words. "Taking chances" (by an engineer) may be defined as depending upon some one else to see that the track is clear, when, by the rule, he should find out for himself; and if the superintendent really intends that the engineer shall thus depend, he ought, in justice to the runner, to say so. As long as a road is lined with signals which the engineer of a fast train can easily see 50 rods away in clear weather (and can therefore make sure of their indications without slackening his speed), but which he is required by the rule to see with equal certainty in all weathers, he is very likely to "take the chances" when there is a fog, unless the trainmaster is very considerate and discriminating in his criticisms of the train sheet at such times. Moreover, a runner whose conception of the rules is not particularly clear will take these chances to save a little time when he might make up that time somewhere else, and we have, beyond this, to take into account the occasional man who likes to take chances, anyway. Whichever kind of men a superintendent is dealing with, he should try to make their understanding and his exactly correspond.

Annual Report.

Chicago & Northwestern.

The annual report for the year ending May 31, 1890, the 31st fiscal year, contains the following statistics: Passenger earnings, $6,285,179, increased but $23,000 over the previous year; the number of passengers carried increased about two millions, but the shortening of the average journey by half a mile and the reduction in fare left receipts nearly as before; though mileage of passenger trains increased 147,300 and that of passenger cars 1,653,543, thus leaving the whole passenger service less profitable than the year before. In great contrast is the freight, whose earnings amounted to $19,654,213, being 1½ million dollars larger than last year, and the largest in the history of the company. This increase in gross earnings of $1,472,578 was accompanied by an almost equal increase in operating expenses (which were $15,325,650 in 1888-9 and $16,651,002 for the year now reported), so that the net results to bond and stockholders were almost precisely similar, the surplus after all payments, being in round numbers $625,000 in both years. Dividends were $3,444,979, being 6 per cent. on the common and 7 per cent. on the preferred stock. The cost of engine service per mile run shows little variation for a number of years, being .1764 cents in '87, .1813 cents in '83, and .1784 cents in the present report. Part of this increase in expenses was caused by the additional miles run, while the balance was expended upon renewals and repairs of track and cars. Thus the cost of renewal of ties in track was $67 per mile in '88 and $133 per mile in '89. The total operating expense per *revenue* train mile run was 75 cents in '87, 79 cents in '88, and 81 cents in the past year. The average freight train load was 133 tons in '87, 136 tons in '88, and 138 in '89. The average haul was 178 miles in '87, 162 in '88, and 152 in '89. Thus the increase in tons handled has been accompanied by a decrease in length of haul and a slight increase in the average train load.

Improvements to road and additional equipment required an expenditure in round numbers of $2,500,000, which is a charge to capital. No new road was added during the year, the mileage (4,250) operated being but six miles more than the previous year. No changes of consequence took place in either stock or bonded capital. The improvements to the ore docks at Escanaba were completed and the passenger station at Milwaukee was finished. The construction of the second main track upon the Milwaukee and Galena divisions was continued, the balance of second track between Chicago and the Mississippi being expected to be ready for the heavy fall traffic; 77 miles of side track was also laid. Net cash receipts from land were $400,000. The net surplus of the Trans-Missouri lines after meeting all charges was $112,457.

The report says: The Fremont, Elkhorn & Missouri Valley Railroad Company, in response to numerous and urgent appeals of the people of Deadwood and adjacent country, has undertaken the construction of its line from its present northern terminus near Whitewood, S. D., into Deadwood, a distance of about 12 miles, also a branch from the main line, in the vicinity of Buffalo Gap, to Hot Springs, about 15 miles, and an extension of the main line from Whitewood, in a northwesterly direction, a distance of about 35 miles; making in these three projected lines about 62 miles of additional railroad to be constructed to bring the region and resources of the Black Hills in their development of coal and metal, mining and other industries, into direct communication with the great railway systems of the country, which will be reached through a connection with the existing lines of this company's railroad. This construction has been long under advisement, but has been delayed owing to its location through a rough and rugged country, requiring much heavy work, and, on the Deadwood line, costly tunneling, all of which will add considerably to the average cost of the railroad.

The Northwestern, as usual, makes a fine exhibit of the earning power of the road. Its well-located lines and able management account for its success, and Prosperity is the only comment necessary to make upon the yearly showing.

Grain-Handling in the Northwest.

The recently announced determination of the owners of grain elevators in North Dakota not to store grain this year, because of the law passed by the last legislature restricting the rates, has attracted much attention among Northwestern railroad men. No question of freight tonnage is of more importance to the railroads of the Northwest than this one of handling wheat. This is no less due to the enormous quantities of grain hauled every year in the states of Minnesota, North Dakota and South Dakota, amounting in average years to 125,000 cars, or 75,000,000 bushels, than to the fact that over ninety per cent. of this class of freight is handled through the country elevators. The country elevator system grew up with the country. Along and upon the right of way of the railroads, privileged parties were permitted to erect grain houses and elevators at the different stations, which have enjoyed the facilities of side tracks and other advantages not given to the general public. Parties could erect these houses only upon such terms and conditions as the companies saw fit to impose. In course of time the application for such sites became greater than the companies were willing to grant and led to many refusals. The parties refused claimed that the railroad companies were discriminating unjustly, and practically saying who should and who should not buy and ship grain over their respective lines.

This led to much friction between the common carriers and private shippers of grain, so called. Public feeling was stirred up to such a point that in Minnesota in 1885 a "granger legislature" was elected and passed a law compelling every railroad company in the state to permit "any person, company or corporation, for an annual rental of $1, to construct, maintain and operate an elevator or warehouse at any of its regular way stations," etc. This law, on a test case in the Supreme Court of the state, was promptly decided unconstitutional, and there has been no subsequent enactment relating to it.

It is not probable that the threats of the North Dakota elevators, to refuse storage of grain, will be carried out,

as the railroads are opposed to such action. But there is good reason for believing that the legislature of Minnesota, which meets next January, will pass a law for the "free shipment of grain" which will insure to the individual shipper the same rights and privileges which are now enjoyed by the elevator companies. The form of the law will probably be such as to provide that any party wishing to build a structure upon his own land adjoining the railroad right of way shall be permitted to do so and may apply to the state railroad commission for an order requiring the railroad company to build side tracks and furnish shipping facilities upon such terms and conditions as may be reasonable and just.

The practical effect of such a law, or of the refusal of the grain elevator companies to do a public business, would be to increase the demands on the railroad companies for cars, to a point far beyond their power to furnish. Already the Great Northern and Northern Pacific companies receive more calls for cars during the months of September, October, November and December of each year than they can respond to, and each year the problem of handling the grain crop of the Northwest becomes a more serious one.

No legislation can compel the railroad companies to make heavy and expensive additions in their rolling stock to meet a demand which is practically confined to four months in a year, and while the companies manifest a disposition to do all in their power to supply cars as required, they will not voluntarily make up their equipment on the basis of four months' heavy traffic.

The roads handling the grain brought to the three great terminal markets—Minneapolis, Duluth and St. Paul—are really but six in number, the other roads running into these cities carrying such small quantities of grain as not to have any weight in the year's summary. The following table, compiled from the official statistics of the chief grain inspector of Minnesota, will show the handling of last year's crop:

Name of road.	Percentage of crop handled.	Percentage of grain to total tonnage.
Great Northern	45	18.75
Northern Pacific	20	18.60
Chicago, Milwaukee & St. Paul	18	18.40
Chicago, St. Paul, Minneapolis & Omaha	10	14.94
Minneapolis & St. Louis	6	19.74
Minneapolis, St. Paul & Sault Ste. Marie	1	11.57

From the official reports of the railroad companies the following figures showing the total mileage of each road, together with the number of box cars suitable for carrying grain, are taken. No grain is carried in sacks or bags, all being loaded in bulk:

Name of Road.	Mileage operated.	Cars owned.
Great Northern	3,454.52	5,839
Northern Pacific	4,066.81	4,918
C., M. & St. P.	5,678.15	14,397
C., St. P., M. & O.	1,695.35	4,982
Mpls. & St. Louis	444.70	200
M., St. P. & S. Ste M.	887.88	2,664

The short season for handling the crop is one of the important factors to be taken into consideration. The crop year begins on Sept 1. By that date all of the old crop is out of the elevators, and though a little of the new crop comes in during the month of August, it is too small a quantity to be taken into consideration. Let us examine for a moment the handling of the 1888 crop, which is fairly typical. The 1889 crop is not yet all out of the elevators. In September, 1888, the railroads of Minnesota moved 8,748 cars of grain; in October there were handled 12,804 cars, and this large movement kept up through November, only 300 cars less being handled in that month. In December there was a return to about the amount carried in September, 8,118 cars being hauled. January, 1889, witnessed the sudden falling off in the movement, the rush of grain being over, so that only 2,882 cars were carried, and from that time until May the movement increased at the rate of about 1,000 cars per month, due to the higher market. In May the movement fell back to 4,548 cars and did not vary 1,000 cars from that figure in any month, until it went flying up to over 9,000 cars, consequent upon the harvesting of the 1889 crop. In brief, 42,000 cars of wheat are handled in the months of September, October, November and December, and 32,000 cars in the remaining eight months of the crop year.

It will be evident from an examination of the figures that handling the Northwestern wheat crop is no easy matter for the railroads, and presents difficulties with which it is hard to cope. It is estimated that the wheat crop of the Northwest will this year far exceed anything that the roads have had to deal with for several years. How will the problem of supplying cars be met? This is a question that troubles general managers every year at this time, and particularly this year when the new phase put on the question by the elevator owners and the prospect of embarrassing railroad legislation complicate the matter. It is likely that a solution of the question will be reached by legislation in the nature of a compromise. To require the railroads to purchase extra equipment for handling a four months' business would be utterly unreasonable. There is no question but that the most rapid and economical method of handling the grain crop is through the country elevators; but the public must be protected, and it may be that to accomplish this all elevators in the state will be made "public elevators" under the control and supervision of the grain and warehouse law. The State Railroad Commission of Minnesota favors such a law, and it is perhaps not too much to hope that a "granger legislature" may in time come to see the practical wisdom of such a plan, and, meeting the railroad companies half way, pass a law that shall work for the good of both interests.

The most noticeable feature of the bill-of-lading controversy just at present is the undisturbed manner in which shipments seem to continue coming eastward from Chicago by the various lines, notwithstanding the fierce boycott, which it was threatened would play havoc with the obstinate roads. Whether the freight agents have quietly suspended the rules, or the shippers' anger found vent chiefly through resolutions and press dispatches, we do not know. The conference, at Chicago, of merchants of that city and those of other cities in the East and elsewhere, who had been invited, appointed a committee to draft a new bill of lading. This committee made a number of intelligent changes in the uniform bill as promulgated by the roads; but as the work was somewhat hastily done and apparently without careful investigation of the legal points, the committee's report can hardly be called more than a tentative proposition. Assuming that the railroads had claimed everything they could, the committee may be said to have simply made an effort to offset those claims by others equally comprehensive. Mr. Blanchard promises the merchants to promptly consider amendments proposed by them, and says, with considerable force, that whatever may or may not be done, the uniform bill is probably the best basis to start from. To begin anew would waste much valuable work. If the Chicago conference leads to a national organization of shippers, which shall have influence commensurate with the importance of the interests involved, it will have done great good, as the railroads would then have a definite body to deal with. The intangible nature of "the public" is responsible for a large share of the fruitless wrangling that goes on year after year.

NEW PUBLICATIONS.

Central-Hudson Magazine.—The official pocket time-table of the New York Central & Hudson River road now comes out in the form of a book of 116 pages, 4×8 in., which is announced as a monthly magazine under the above title, the first number being dated July, 1890. The magazine contains, besides time-tables, in which p. m. time is shown in heavy figures and an official directory of officers and station agents, the usual information about sleeping cars, connections, stage connections, etc., sketches of towns along the line, a map of New York City, which is well designed but printed in poor colors, and religious, ethical, philosophical and comic items to fill out the pages. It is intended to print fresh information each month, including new sketches of the towns and points of interest along the line. There are a few advertisements, but not enough to bury the time-tables out of sight, as is the case with some time-tables, among which we believe some of the Central's have heretofore been found. While we cannot enthusiastically commend the abbreviation which Mr. Daniels has adopted for his title, although it is considerably used along the line of the road, we heartily approve of the "Magazine." If, now, the Central will make an invariable rule not to change the time of trains except on a certain day of each month, so that the date of the magazine will always be a sure indication to the reader of its genuineness as a time-table, a great step in advance will have been taken, and the encomiums of country newspapers upon the company's enterprise will be heartily seconded by everybody. It is stated that each monthly edition of the magazine will consist of 30,000 copies, from which we conclude that local passengers, and a good many others, will have to put up with some less complete pamphlet.

Poor's Manual of Railroads for 1890. *Twenty-third Annual Number.* New York. H. V. & H. W. Poor, 70 Wall street. 1890. Price, $6.

We gave week before last extracts from the introduction to this volume of this standard work. It is not necessary to say more here than to announce its appearance, for all of our readers know its scope and character. As the years go on, the value of the Manual becomes greater, and nothing has yet appeared that threatens to take its place or to diminish its importance to students and investors. The traffic statistics, while lacking some items which are given in the report of the Interstate Commerce Commission's statistician, contain others and important ones, which are not given in that report, and others that can only be found from it by computation. Beyond this, however, the "Manual" holds its place by the fullness of its histories and statistics of the individual roads. This is after all not only much the greatest part of the volume, but to most people much the most valuable part. A new feature has been introduced this year in the small maps of individual systems. These maps are 51 in number and each fills a page. They give with considerable accuracy the geography of each road or system so treated and will be found a great convenience by those who have occasion to use the volume. We understand that this feature will be considerably extended another year.

TRADE CATALOGUES.

Jenkins Bros., 71 John street, New York City, have issued a revised edition of their catalogue of standard packing, containing a price list of the different sizes The list prices for packing have been raised to conform to the old list, and the reduced list sent out a few months since is now replaced by the one just issued. The catalogue also contains descriptions, cuts and prices of various damper regulators, valves, pipe-hangers, traps and other devices manufactured by the firm.

Nicholson & Waterman, machinists and toolmakers, Providence, R. I., have published a small pamphlet entitled, "How to Bore a Hole True." It describes Nicholson's horizontal boring machine and is well illustrated by wood cuts and pen sketches. The wrapper bears a "Notis" in the shape of a "bluff," but in spite of this the pamphlet is really a clever piece of advertising and contains interesting matter in condensed form.

Duration of the Electric Spark.

Sir Henry Trueman Wood, M. A., in a recent paper before the Photographic Society (English), speaking of the duration of an electric spark, said: "Another interesting result obtained by photographing the electric spark is that a measure of its duration may be obtained. I am able to show you some photographs of the spark taken on a rapidly rotating plate. The plate, or film, for many of the photographs were taken on paper, was mounted on a disc which was rotated by an electromotor at a speed in some cases exceeding 2,000 per minute. The largest disc was 20 in. in diameter; the smallest about 4 in. Of course, the larger the disc the greater the circumferential speed, but in practice the motor I was using could not drive the large discs at a very high speed, and the greatest speed I got was with a disc 8 in. in diameter (effective) running at 1,500. This gave a speed of 600 in. per second at the point where the outer end of the spark was photographed. There is no perceptible difference in the width of a spark taken when the plate is stationary and that of one taken when the plate is running full speed, and certainly it is not displaced to the extent of the twenty-fifth of an inch. It follows from a simple calculation that it does not last the 10,000th part of a second."

LOCOMOTIVE BUILDING.

Brooks Locomotives for Various Roads.

A correspondent sends the following notes about the work in progress at these shops:

The company has been awarded the contract for building six ten-wheeled engines, intended to haul heavy fast passenger trains on the Atchison, Topeka & Santa Fé road. These engines are to be in every respect of modern type and in accordance with specifications furnished by Mr. John Player, Superintendent of Machinery of the Santa Fé system. They will have 19 × 26-in cylinders, and driving wheels of 63 in. diameter over 3½-in. tires. The engine truck wheels will have steel tires, and there will be brakes on each driving wheel. The boiler will be of the wagon-top crown-bar type, 60 in. diameter at front end, with 267 flues, 2 in. diameter. These engines will weigh in working order about 130,000 lbs., of which 104,000 will be on the drivers.

Twenty ten-wheel freight engines are being constructed for the Lake Shore & Michigan Southern road. The cylinders are 17 × 24 in., and the driving wheels 56 in. diameter over 3-in. tire. The total weight of engine in working order is about 100,000 lbs., 73,000 of which is on the drivers. The boiler is 52 in. diameter at the front end, with 186 flues 2 in. diameter, and 12 ft. long. The fire box is 96 × 34⅛ in., placed between the frames and extends over the rear axle, the grate being inclined. The brick arch is carried by water tubes. The longitudinal seams are lapped and triple riveted. The driving wheel base is 13 ft. 3 in., of which 8 ft. is rigid, the front pair of wheels being blind. The engine truck has a rigid centre and cast iron wheels. Driver brakes, of the American pattern, and operated by air, are applied to all the wheels. The tender is equipped with the Westinghouse automatic brake on all its wheels; it has an iron frame, and a tank of 3,100 gallons capacity. These engines are said to satisfactorily handle 50 loaded cars over the flat gradients of the Lake Shore road.

The Illinois Central is having built 25 eight-wheeled passenger engines, with cylinders 13×24 in., and driving wheels 64¾ in. diameter over 3½-in. tires. The total weight in working order is intended to be about 109,000 lbs. The boilers will be of the wagon-top crown-bar type, 56 in. diameter at the front end, the longitudinal seams lapped and quadruple riveted, and designed for a working pressure of 180 lbs. The tubes will be 232 in number, 2 in. diameter, and 11 ft. 7 in. long. The fire-box will be 102×43 ins. and placed on the top of the frames. The throttle and dry-pipe will be 7 in. diameter, and the steam ports of cylinders 17×1⅝ in. The valves are to be of the Allen-Richardson type. The engine truck wheels will be 33 in. diameter over steel tires, and the tender wheels 36 in. in diameter, of cast iron. The driving wheels will have brakes of the American pattern, operated by air; and the tender will be equipped with the Westinghouse automatic brake. The tender tank will be of steel, and of 3,850 gallons capacity.

The works have recently delivered to the Ulster & Delaware road a six-wheeled switching engine having, without driver brakes, which are to be applied by the owners, a total weight of about 105,000 lbs. The boiler is of the wagon-top crown-bar type and 57 in. diameter at front end. The fire box, 102 × 42 in., is upon the top of the frame, the cylinders, 20 × 24 in., and driving wheels 50 in. in diameter. The tank is of the sloping back pattern and of 2,750 gallons capacity.

CAR BUILDING.

The Grand Trunk has just received five new Pullman cars for the line between Chicago and Boston. Each car has 12 sections, drawing room, smoking room and buffet. The cars are lighted by the Pintsch gas system. They are finished in mahogany and upholstered in blue and gold. They have a library of a couple of hundred volumes.

The Wagner Palace Car Co. has begun the building of ten new sleeping and six drawing-room cars at its Buffalo shops.

The Central of Georgia has recently placed an order with the Ohio Falls Car Co. for 32 new passenger cars,

two sleeping cars, 100 coal cars and 50 stock cars, in addition to orders already given to that company, which, in all, will increase the freight equipment about 2,000 cars, passenger equipment 44 and sleeping car equipment four.

Osgood, Bradley & Sons, of Worcester, Mass., have recently completed 12 freight cars for the Boston & Albany.

The Chicago, St. Paul & Kansas City has placed an order for an entire new vestibule passenger equipment for its limited trains between Chicago and St. Paul, and also on its new line from Chicago to Kansas City.

The Ohio Falls Car Works, of Jeffersonville, Ind., have contracted to build 250 box cars for the Pittsburgh, Akron & Western.

BRIDGE BUILDING.

Apalachicola, Fla.—J. N. Cook, Chief Engineer of the Augusta, Tallahassee & Gulf, will, it is reported, soon let the contract for a bridge over the Ocklockonee River.

Augusta, Ga.—The council has decided to build, at a cost of $8,000, a new bridge over the canal at Broad street, in Harrisburg.

Bowmanville, Ont.—The Town Council of Bowmanville has accepted the tender of the Trenton Bridge Co. for a steel bridge of two spans 85 ft. long, 18 ft. wide for $5,320.

Buchanan, Va.—The Central Land Co. has let the contract for a bridge across the James River.

Cape Breton.—The last span of the Grand Narrows Bridge on the Cape Breton road was placed in position a few days ago. The whole work of moving and placing the spans took only 28 minutes. The span is 240 ft. long, and weighs 225 tons.

Denison, Tex.—The city will soon let the contract for the construction of an 1,800-ft. viaduct, 20 ft. wide, across the railroad at Gandy street.

East Lyme, Conn.—The New York, New Haven & Hartford is to build a new double track iron drawbridge over the Niantic River near New London, between East Lyme and Niantic on the Shore Line division. It will replace the present single track bridge, which is 190 ft. long. The new structure will cross the river 225 ft. south of the present bridge. It will have four spans, each 50 ft. long, and a draw span of 135 ft. operated by steam. Its total length will be 335 ft. and there will be a clear waterway of 280 ft. Both approaches to the bridge will be solid embankments. The channel through the draw will be dredged to a depth of 15 ft. below low-water mark. The cost of the superstructure and masonry work will be $125,000, and of the entire structure over $200,000.

Florence, Ala.—The bridge over the Tennessee River at this place for the Memphis & Charleston is being built by the Edge Moor Bridge Works, of Wilmington, Del., and not the Shelby Iron Works.

Groesbeck.—The contract has been let at $8,450 for the construction of two iron bridges across the Navasota River, one at Groesbeck and the other at Rocky Crossing.

Jackson County, W. Va.—The County Commissioners of Jackson County have ordered two new bridges to be built, one over Little Mill Creek and the other over Dudden's Fork. Both bridges are to be of steel, one 90 ft. span and the other 60 ft.

Jefferson County, O.—The County Commissioners of Jefferson County will receive bids at Steubenville till Aug. 26 for the construction of 11 new bridges in different parts of the county. The bridges are all to be of steel and the contracts will include the stone work on the abutments and piers.

Lake Temiscamingue.—Some surveyors from the Department of Public Works have been sent to locate a site for the proposed new bridge over the Ottawa River at the foot of Lake Temiscamingue.

Lewis County, W. Va.—The contract for a double roadway bridge with sidewalks across West Fork River and another across Freeman's Creek, both in Lewis County, were awarded to the Youngstown Bridge Co. last week.

Lynchburg, Va.—The City Council has ordered the construction of an iron bridge across Blackwater Creek at the intersection of the Norfolk & Western and Richmond & Danville roads.

Monticello, Miss.—The Columbus Bridge Co. has commenced work on the bridge at Monticello, Miss., over Pearl River. It was about completed last April when washed away.

Newport, Ky.—Proposals for the erection of an iron or steel bridge, of about 30 ft. span, will be received by the Newport Water-Works until Aug. 22. Specifications can be obtained from Chas. L. Jungerman, Superintendent of the water-works.

It is stated that a new iron bridge will be built across Taylor's Creek.

Orange Grove, Md.—A movement is said to be on foot to bridge the Patapsco River at Orange Grove, Baltimore County.

Parkersburg, W. Va.—A number of citizens of Parkersburg have petitioned the County Court for a drawbridge over Market street in that city. There is prospect of the petition being granted.

Pittsburgh, Pa.—The consent of the abutting property holders has been secured to the erection of a bridge over the railroad tracks at Roup Station, by the Pennsylvania.

Peterboro, Ont.—The Central Iron Bridge Works, of Peterboro, Ont., have reduced their staff largely, and may, perhaps, have to shut down entirely. The works have a large number of orders, but material ordered from Glasgow has failed to arrive, and this may necessitate the suspension of the works.

Ironton, O.—H. C. Burr, City Clerk, will receive proposals for the construction of a three-span iron highway bridge over Ice Creek until Aug. 12. Bidders are to submit their own plans.

Prineville, Ore.—A suspension bridge is to be built across Crooked River by the county court of Crook County. Bids will be received until Sept. 3 by Arthur Hodges, County Clerk.

Seattle, Wash.—The County Commissioners have been asked to aid in the construction of a bridge across the eastern arm of Lake Union, at Latona. The bridge, when completed, will be 650 ft. long, with a span of 100 ft., 40 ft. wide, and 25 ft. above the water. Its estimated cost is $6,000. Of this amount the petitioners have raised $3,500, and ask the county to contribute $2,500.

Washington, D. C.—The Pennsylvania avenue bridge has been turned over by the United States officers to the jurisdiction of the District Commissioners.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In New York, in an action to forfeit a railroad company's charter, because of its failure to extend its line as the charter required, defendant being a new railroad company, organized on foreclosure of a mortgage given by the company to which the charter was originally granted, issue was joined before the passage of Laws N. Y. 1889, c. 236, which relieves such a road from extending its line beyond the portion constructed at the time it acquired title, provided the railroad commissioners certify that the public interests do not require such extension. The Supreme Court holds that the railroad may set this statute up in defence.[1]

In Kentucky the Court of Appeals rules that under the state statute giving an action to recover punitive damages to the widow, heir or personal representative of a person whose death is caused by willful neglect, no recovery can be had if the deceased left neither widow nor child.[2]

In Michigan the Supreme Court holds that under the statutes which provide that, in an action by an administrator against a railroad company for the alleged negligent killing of his intestate, the jury shall give such damages as are "fair and just," which shall be distributed to the persons entitled thereto under the statute of distributions, the administrator must show that some person has suffered pecuniary injury by the death; and where it appears that the intestate had a father and a brother, but that no one was dependent on him for support, it is proper for the court to order a non-suit.[3]

Injuries to Passengers, Employees and Strangers.

In Nebraska, the Supreme Court rules that a sleeping car company, so far as it renders service similar in kind to an innkeeper, is subject to the same liabilities; and where an article of wearing apparel belonging to a passenger in a sleeping car has been placed in the care of the porter, and is stolen from the car, the company will be liable therefor.[4]

In Texas a passenger on a sleeping car being told he would have to change cars on account of a wreck, started forward with all the other passengers, but upon missing his pocket-book returned to his berth, where he had left it. No one was in the car after the passengers left, except the conductor, porter and a train brakeman who passed through without stopping. The conductor, porter, and passengers were searched, but the pocket-book could not be found. The Supreme Court holds the company liable.[5]

In New York, in an action against an elevated railroad company for personal injuries, there was evidence that the platform of a station, on which passengers alighted from defendant's cars, was built on a curve, so that a car in stopping there touched it at a tangent, leaving a space of 14 in. between the steps of the car and the platform. Plaintiff, who was a passenger on one of the cars, in attempting to step from the car to the platform stepped into this space, which was open and unguarded, and was left in comparative darkness, and was severely injured. She was unfamiliar with the locality, having never gotten off there before. The Court of Appeals rules that the questions of negligence and contributory negligence were for the jury.[6]

In Missouri a passenger on a grip-car pulled the rope for a stop at a crossing, but the signal, being out of order, gave no sound, and, while the car was in full motion, without signaling the conductor or gripman, who was near him, he stepped out of a side door, which was open and unguarded, and was struck immediately by a car passing on another track. The Supreme Court holds that he was guilty of contributory negligence.[7]

In Alabama the Supreme Court rules that, in the absence of statutory requirements, the engineer of a railroad company is under no obligation to blow the whistle on approaching villages, or other collections of houses, adjacent to the track.[8]

In Pennsylvania the Supreme Court holds that the fact that the plaintiff went on the track while another train was passing over the crossing, two tracks intervening, does not render him guilty of contributory negligence. In this case the plaintiff, a boy 10 years old, was injured at a public crossing, about 400 ft. from which there was a sharp curve in the track. Plaintiff's hat had been blown off, and he went on the track to get it. He testified that before so doing he looked both ways and listened; and that, no train being in sight or hearing, he went on the crossing, stooped down with his back towards the curve, and was in the act of straightening up to retrace his steps when he was struck. Other witnesses in plaintiff's behalf testified that no bell was rung or whistle sounded. The Supreme Court rules that though plaintiff was struck shortly after stepping on the track, and though defendant's witnesses testified that the bell was rung and the whistle sounded, the evidence was sufficient to take the case to the jury on the question of plaintiff's contributory negligence.[9]

In Michigan the plaintiff's intestate was walking along a road toward where it was crossed by defendant's tracks, and before he reached the crossing some of defendant's cars were stopped there, blocking the way. The grade was steep. The brakeman on the cars left them, and went off to some distance. There was a snow-bank on the side of the track, between which and the cars there was no room for a man to walk. There was evidence that intestate attempted to walk on top of this snow-bank, so as to go around the end of the cars, when they started, throwing him beneath them and killing him. The Supreme Court rules that the question of contributory negligence was for the jury.[10]

In Pennsylvania the deceased heard the whistle of the approaching locomotive, which was about 1,000 ft. distant, and beyond a station at which trains, including the train in question, usually stopped, and stopped his team about 50 ft. from the crossing. The view of the track was obstructed by a hill; and after stopping he drove on. There was evidence that he again stopped, or attempted to do so, but, one of his horses being young and excitable, he either drove or was carried on the track, and that the foreman of a gang of workmen made gestures in the direction of deceased, but whether they were intended for deceased or for the workmen was not clearly understood by the witnesses. The Supreme Court holds that it was error to grant a nonsuit on the ground of contributory negligence.[11]

In North Carolina the Supreme Court rules that in an action by a servant against his master for injuries caused by defective machinery, he is not bound to show that its condition was not, and could not, by the exercise of reasonable care, have been known to him.[12]

In Massachusetts the Supreme Judicial Court holds that an instruction "that if defendant had used reasonable care in the supervision of the sectionmen, and of the use of the yard, plaintiff could not recover for the neglect of the sectionmen in leaving the ties by the track, or the neglect of the yard-master or sectionmaster or road-master in failing to have them removed," is properly refused, as requiring due care only in supervision of the sectionmen and use of the yard.[13]

In Nebraska the Supreme Court rules that in an action for injuries to a switchman caused by one of defendant's locomotives getting beyond the control of the engineer, an instruction that if plaintiff received his injuries through the carelessness of the engineer, and not from the defective condition of the engine, the defendant is not liable, is not open to the objection that it makes it incumbent upon defendant to show that the injuries resulted through the carelessness of the engineer.[14]

In Texas the plaintiff was injured while repairing a car. He testified that, before he went under the car, H., his foreman, promised to see that he was not injured; defendant requested an instruction that if H. "abandoned the watch with plaintiff's knowledge," and then plaintiff continued the work, relying on the promises of two of his fellow-servants to keep a lookout, and was hurt by their failure to do so, then the jury must find for defendant. The court of his own motion added, by interlineation, after the word "knowledge," the following: "And that plaintiff knew, or ought to have known, that H. would not, by himself or others, protect him." The Supreme Court holds that this was not error, for, even if H. had abandoned the watch with plaintiff's knowledge, the jury might reasonably have concluded that plaintiff still relied upon him to take other steps for his protection.[15]

[1] People v. U. & D. R. Co., 8 N. Y. Supp., 149.
[2] L. & N. R. Co. v. Merriweather, 12 S. W. Rep., 935.
[3] Van Brunt v. C. J. & M. R. Co., 44 N. W. Rep., 321.
[4] Pullman Pal. Car Co. v. Lowe, 44 N. W. Rep., 226.
[5] Pull. Pal. Car Co. v. Mathews, 12 S. W. Rep., 744.
[6] Boyce v. Manhattan Ry. Co., 23 N. E. Rep., 304.
[7] Weber vs. Kansas City Cable Ry. Co., 12 S. W. Rep., 804.
[8] Carrington v. Louisville & N. R. Co., 6 South. Rep., 910.
[9] Penn. R. Co. v. Wilson, 18 Atl. Rep., 1087.
[10] Adams v. Iron Cliffs Co., 44 N. W. Rep., 270.
[11] McNeal v. Pittsburgh & W. R. Co., 18 Alt. Rep., 1026.
[12] Hudson v. Charleston, C. & C. R. Co., 10 S. E. Rep., 669.
[13] Babcock v. Old Colony R. Co., 23 N. E. Rep., 325.
[14] B. & M. R. Co. v. Wallace, 44 N. W. Rep., 223.
[15] Missouri Pac. R. Co. v. Williams, 12 S. W. Rep., 835.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Maine, $3 per share on the preferred stock, payable Sept. 1.

Chicago, Burlington & Quincy, 1¼ per cent., payable Sept. 15.

Cleveland & Pittsburgh, quarterly, 1¾ per cent., payable Sept. 1.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston, Hoosac Tunnel & Western, annual, Grand Union Hotel, Saratoga Springs, N. Y., Aug. 20.
Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 20.
Dallas & Greenville, annual, Dallas, Tex., Sept. 6.
Dallas & Waco, annual, Dallas, Tex., Sept. 6.
Dallas & Wichita, annual, Dallas, Tex., Sept. 6.
Gainesville & Henrietta, annual, Gainesville, Tex., Sept. 9.
Illinois Central, annual, Chicago, Ill., Oct. 8.
Norfolk & Virginia Beach, annual, Norfolk, Va., Sept. 4.
Nova Scotia Midland, annual, New Glasgow, N. S., Sept. 1.
Port Arthur, Duluth & Western, special, Port Arthur, Ont., Aug. 19, to consider a proposed issue of bonds.
St. Louis, Alton & Terre Haute, special, Laclede Building, St. Louis, Mo., Oct. 3, to consider the sale to the Cairo, Vincennes & Chicago.
Wabash, annual, St. Louis, Mo., Sept. 9.
Troy, Saratoga & Northern, annual, Grand Union Hotel, Saratoga Springs, N. Y., Aug. 20.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Traveling Passenger Agents' Association* will hold its next annual convention at Buffalo, N. Y., August 19.

The *New England Roadmasters' Association* will hold its eighth annual meeting at Boston, Mass., Aug. 20 and 21.

The *National Association of General Passenger & Ticket Agents* will hold its next semi-annual meeting at Denver, Col., Sept. 17.

The *American Society of Railroad Superintendents* will hold its annual meeting in New York City on the day preceding the fall meeting of the General Time Convention.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m. The Club has adjourned until Tuesday, Sept. 16.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *Northwest Railroad Club* meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Saturday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month. The next meeting will be held the third Wednesday in September.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m , on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the Southwest* holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m., on the third Saturday in each month.

The Civil Engineers' Club of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Engineers' Society of Western Pennsylvania.

Society met at their rooms at Pittsburgh, June 17, 1890. W. L. Scaife, President; P. Barnes, Vice President, and 28 members and visitors present.

The President announced that copies of the Proceedings of 1889, bound in muslin, can be had on application to the Secretary, by all members whose dues are paid, on the payment of twenty-five cents.

The following resolutions were offered by Arthur Kirk, and, after full discussion, adopted:

Whereas The United States Government is about to construct, in the Allegheny River, near Herr's Island, in the heart of the cities of Pittsburgh & Allegheny, a fixed dam and lock; and

Whereas, A fixed dam at the place will, during ordinary floods which now pass by without damage to any interests, raise the surface of the water several feet; and

Whereas, Above the locality where the dam is to be located there are a number of extensive manufacturing establishments whose grounds and furnaces will be overflowed in case the dam is constructed as now designed, and this several times each year, resulting in great loss of material and the stoppage of works which employ several thousand operatives; and

Whereas, A fixed dam at this place will be liable, by reason of the narrowness of the river and the obstruction of the dam itself, to interfere with the free passage of ice in the annual break-ups of the Allegheny River, in which event destructive ice gorges, attended with immeasurable damage and probable loss of life, will result. Therefore,

Be it Resolved, By the Society of Engineers of Western Pennsylvania, while fully recognizing the value of the proposed improvement, which promises to extend the limits of the permanently navigable harbor of Pittsburgh, that Col. W. E. Merrill, of the U. S. Engineers in charge of said harbor improvement, is respectfully requested to urge upon the government the necessity and importance of adopting for this place some form of movable dam which shall prove no obstruction to the free discharge of the river during its flooded period.

The Committee on Roads was requested to report in full at the next meeting.

Phineas Barnes addressed the Society, illustrating his remarks on the blackboard, on "Sundry Rolling Mill Appliances."

New England Roadmasters' Association.

The eighth annual meeting of the Association will be held at the American House, Boston, Mass., Aug. 20 and 21:

Reports are expected from committees on the following subjects:

1. Best and most economical method of repairs to track in the winter and spring months.
2. Inspection of roadbed—daily and yearly inspection; premium system.
3. Experience with frogs and switches now in use, and the greatest cause of their failure.
4. Railroad ties; dimensions, position and number to be laid per mile under 56, 60, 72 and 76-lb. rails.
5. Reviews of previous year's discussions.

The committees appointed on these subjects are: 1. J. W. Shanks, Chairman, New London Northern; F. C. Clark, Housatonic, and J. W. McManama, Fitchburg. 2. J. R. Patch, Chairman, Connecticut River; C. B. Lentell, Boston & Albany, and R. P. Collins, Old Colony. 3. L. J. Spaulding, Chairman, Fitchburg; A. C. Stevens, Boston & Maine, and S. B. Bodwell, Jr., Boston & Maine. 4. A. C. Bean, Chairman, Central Vermont; R. Hyland, Cheshire, and W. E. Clark, Vermont Valley. 5. J. S. Lane, Chairman; P. A. Eaton, Concord & Montreal, and E. K. Post, New York, New Haven & Hartford.

Southern Railway & Steamship Association.

The Southern Railway & Steamship Association held its annual meeting at New York City last week, and reaffirmed the agreement of last year, elected the old officers and appointed a rate committee, consisting of Messrs. G. S. Barnum, W. L. Guillaudeau, Francis Asbury, T. S. Davant, C. H. Cromwell, S. B. Pickens, A. Pope, T. M. Emerson, G. A. Whitehead, J. H. Drake, F. W. Clark, J. M. Brown, E. K. Dorsey, A. C. Knapp and A. G. Craig.

The officers of the association are: President, Joseph E. Brown; Commissioner, Thomas H. Carter, Atlanta, Ga. Arbitrators, John Scrieven, E. K. Sibley and James N. Ogden; Secretary, Charles A. Sindall, Atlanta, Ga.; Executive Board, Henry Fink, Vice-President East Tennessee & Georgia; W. G. Oskman, Vice-President Richmond & Danville; E. P. Alexander, President Central of Georgia; C. G. Eddy, Traffic Manager Clyde line; J. W. Green, General Manager Georgia Railroad; C. W. Ward, General Manager South Carolina Railroad; J. M. Robinson, President Seaboard & Roanoke; R. A. Anderson, General Manager Western & Atlantic; J. Lane, General Manager Georgia Southern & Florida; E. L. Tyler, General Manager Atlanta & West Point and Western of Alabama, and J. E. Jones, President Covington & Macon.

PERSONAL.

—Mr. George E. Read, who has been Secretary of the Johnson Railroad Signal Co. since its organization, about two years ago, has resigned that position and is not now connected with the company. Mr. D. Phelan has been elected Secretary to succeed Mr. Read.

—Mr. W. H. Lawrence, who has been representative of the A. French Spring Co., Ltd., of Pittsburgh, Pa., for the last 15 years, died at Homewood, near that place, last week. Mr. Lawrence had a very large acquaintance and an excellent reputation for integrity and industry.

—Mr. Henry C. Willetts, Auditor of the Staten Island Rapid Transit Road, died last week at Flushing, L. I., of pneumonia, aged 36 years. He was for some time General Passenger and Ticket Agent of the New York & Northern, resigning about a year ago. He had previously held a similar position on the Long Islaud road.

—Mr. W. J. Knight, President of the Dubuque & Sioux City, one of the Illinois lines of the Illinois Central, has resigned that position. Mr. Knight is an attorney of the Illinois Central, and it is stated that he resigned the presidency of the Dubuque & Sioux City to become General Solicitor of the Illinois Central in Iowa.

—Mr. James C. Boyden, Assistant General Freight Agent of the Chicago, Milwaukee & St. Paul, died last Sunday morning at his home in St. Paul, Minn. He entered railroad service in 1851 on the Norwich & Worcester, and was connected with the Cincinnati, Hamilton & Dayton from 1852 to 1867, when he entered the service of the St. Paul & Sioux City. In 1880 he became connected with the Milwaukee & St. Paul, and had been in continuous service in St. Paul longer than any other railroad man in that city.

—Mr. J. C. Loomis, Superintendent of the Second Division of the Louisville, New Albany & Chicago, has resigned that position, and has been succeeded by Mr. John O. Ewan, Superintendent of Transportation, who was formerly Superintendent of the Indianapolis Division of the Cleveland, Columbus, Cincinnati & Indianapolis. Mr. Loomis was appointed Superintendent of the road last spring, and had previously for a short time been Assistant Superintendent of the Cincinnati Division of the Chesapeake & Ohio. He was also for some time Assistant Division Superintendent of the Louisville & Nashville.

—Mr. E. M. Herr, Superintendent of the Galesburg Division of the Chicago, Burlington & Quincy has accepted an important position as Master Mechanic on the Chicago, Milwaukee & St. Paul. He is one of the best known of the younger railroad men, and has already established an excellent reputation in both the mechanical and operating departments in several important positions on the Burlington. His promotion has been rapid and continuous, and has been earned by strict, earnest attention to duties and superior ability. His first railroad service was on the Milwaukee road to which he now returns. Soon after this he accepted a position as draftsman in the mechanical department of the Burlington at Aurora. He was appointed division superintendent of that road early in 1889, and some months ago was promoted to the position he has just resigned.

ELECTIONS AND APPOINTMENTS.

Alabama Mineral.—The following directors were recently elected at a meeting held in Anniston, Ala.: A. L. Tyler, S. B. Trapp, J. B. Knox, A. L. Tyler, Sr., T. K. Scott, S. E. Noble and H. A. Reynolds. A. L. Tyler, Sr., is President; T. K. Scott, Vice-President; A. L. Tyler, Jr., Secretary and Treasurer. The road is a consolidation of the Anniston & Cincinnati and Anniston & Atlantic.

Atchison, Topeka & Santa Fe.—Charles M. Hicklin has been appointed General Agent, with office at St. Joseph, Mo., to succeed H. A. Russell, the appointment to take effect Sept. 1.

James Dun, Chief Engineer of the St. Louis & San Francisco, has been appointed to a similar position on the Atchison, Topeka & Santa Fe, relieving General Manager A. A. Robinson, who has acted as Chief Engineer in addition to his other duties.

Bayou La Fourche Central.—The incorporators of this Louisiana company are: Joseph Maille, President; Léon Godchaux, Vice-President, and Dr. Felix Gaudin, Secretary and Treasurer. The office is at No. 166 Common street, New Orleans.

Canadian Pacific.—The title of Commercial Agent at Chicago has been discontinued. J. F. Lee has been appointed District Freight and Passenger Agent, with office at 232 South Clark street.

Central of Georgia.—J. R. Mew, formerly of the Savannah, Florida & Western, has been appointed Roadmaster of the South Carolina Division of this line, with office in Augusta, Ga.

Chicago, Burlington & Quincy.—C. M. Higginson, formerly Assistant Auditor of this road, has been appointed assistant to Vice-President Harris.

Chicago, St. Paul & Kansas City.—Tae company is to move the headquarters of its freight department to Kansas City. The change is officially announced, and will probably take place Oct. 1.

Cincinnati & Muskingum Valley.—G. Ericson has been appointed Engineer Maintenance of Way, with office at Zanesville, O., vice W. C. Cushing, transferred.

Columbus Southern.—William Redd, Jr., has been appointed Superintendent of the road, with headquarters at Columbus, O.

The Car Record office of thiscompany has been placed under the control of the Traffic Department and W. D. Brown has been appointed Car Accountant with office at Columbus, Ga.

Dayton, Fort Wayne & Chicago.—At the recent annual meeting of the stockholders the following directors were chosen: Alfred Sully, Eugene Zimmerman, Howard K. Burrass, Julius Dexter, Henry F. Shomaker, S. M. Jenney, F. H. Short, John C. Coombs, M. C. Martin, A. Evans and M. D. Woodford. Eugene Zimmerman was elected President and F. H. Short Secretary and Treasurer.

Eastern Minnesota.—The annual meeting of the company was held in St. Paul, Aug. 13. A complete change was made in the officers and board of directors. The new officers elected are: President, Col. W. P. Clough; Vice-President, W. D. Grover; Secretary and Treasurer, Edward Sawyer. The directors are Messrs. Clough, Grover, Sawyer, E. T. Stephenson and J. J. Hill. The retirement of H. D. Minot from the Presidency of the road has been expected for some time.

East Tennessee, Virginia & Georgia.—E. W. Seiss has been appointed Master of Transportation of the road, with headquarters at Selma, Ala.

Illinois Central.—W. H. V. Rosing has been appointed Assistant Master Mechanic of the Chicago & Pontiac division of the road with office at Chicago. He was formerly Chief Draughtsman.

Lampasas & Southwestern.—The following are the officers of this company: President, P. A. Huffman, Kansas; Vice-Presidents, R. E. Maddox, Fort Worth, Tex.; J. A. Noon, Kansas; Treasurer, T. F. McClure, Ohio; Secretary, M. A. McLaughlin, Fort Worth, Tex.; General Manager, W. A. Disborough, Dallas, Tex.; Land Agent and Auditor, W. Hunstable, Dallas.

Louisville, New Orleans & Texas.—A. A. Sharpe has been appointed Superintendent of the Memphis and Riverside division, Vice W. F. Meath, resigned. A. W. Robinson has been appointed Assistant Superintendent of the Riverside division with headquarters at Greenville, Miss., and P. D. Davis has been made Car Accountant, with headquarters at Memphis.

Middlesborough Belt.—Frank J. Hoyle, who has been Car Accountant of the East Tennessee, Virginia & Georgia for nine years, has resigned, to accept the position of General Manager of this road, with office at Middlesborough, Ky.

Midway (Kansas).—The directors of this company are: E. H. Brown, Girard; John T. Morrison, Pittsburgh; C. H. Nettles, Topeka.

New Brunswick.—At the annual meeting of this company the old directors were re-elected with the exception of John Turnbull, of Montreal, in place of Sir George Stephens. Robert Meighen, of Montreal, was elected President and J. Kennedy Tod, of New York, Vice-President.

Richmond & Danville.—I. Y. Sage having resigned his position as General Superintendent of the Georgia Pacific division, that office has been abolished. The jurisdiction of W. H. Green, General Superintendent of the lines east of Atlanta, has been hereby extended over the Georgia Pacific division. In addition to his duties as Superintendent of the First district, C. P. Hammond has been appointed Acting Superintendent of the Georgia Pacific division, with headquarters at Birmingham.

St. Louis, Arkansas & Texas.—C. E. Niswonger, formerly Commercial Agent of the Kansas City, Fort Scott & Memphis, has been appointed General Agent of this road, with office at Memphis, Tenn. S. G. Warner, late Traveling Passenger Agent, has been appointed General Southeastern Passenger Agent of the same line.

St. Louis, Kansas City & Colorado.—F. H. Riley has been appointed Assistant Superintendent of the road in charge of track and transportation, vice C. Heisley, resigned.

San Antonio & Aransas Pass.—Mr. C. Shiner has been appointed Live Stock Agent, with headquarters at San Antonio, Tex.

St. Joseph, Tarkio & Northwestern.—The following is a corrected list of the incorporators of this Missouri road: D. Rankin and W. A. Rankin, Tarkio, Mo.; A. Schuster, Savannah, Mo.; Jas. Craig, Jr., and G. M. Sutherland, St. Joseph, Mo.; H. C. Keller, Leavenworth, Kan.; J. J. Brown, Graham, Mo.; W. A. Thomas, Fairfax, Mo.. C. R. Berry, St. Joseph, and S. H. Prather, Tarkio, Mo.

St. Louis, Chester & Grand Tower.—The directors of this company are: S. Dwight Eaton and H. M. Pollard, St. Louis; Thomas N. Chase and M. C. Brown, East St. Louis, and William F. Barrett, Chicago; S. Dwight, Eaton, 3,670 Cook avenue, St. Louis, is President.

Union Pacific.—A. H. Crocker has been appointed Superintendent of the Pacific division, with headquarters at Portland, Or., vice C. W. Johnson, resigned.

Washington Coast Railroad & Terminal Co.—The incorporators of this Washington road are: J. H. Smith, W. H. Kennedy, R. E. Brown, John Hale and W. H. Young, of Tacoma.

Western of Alabama.—The office of General Freight and Passenger Agent of this road and of the Atlanta & West Point has been abolished, and the office of Traffic Manager created in its stead. C. H. Crumwell, who has been General Freight and Passenger Agent, has been appointed Traffic Manager.

Western & Atlantic.—Charles B. Beardsley has been appointed Car Accountant of the road, with office at Atlanta, vice E. C. Spalding, resigned.

West Shore.—W. W. Wheatley has been appointed Assistant Superintendent with office at East Buffalo, N. Y.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Alabama Mineral.—The rails for the standard gauge track of this road have been laid from Anniston to Sylacauga, and the new equipment will be placed in service between these points in a few days. Tracklaying will be continued from Sylacauga to Shelby and Calera, Ala., 33 miles, to which point the grading for the extension is about finished.

Atlanta & Decatur.—R. M. Brooks & Sons, of Atlanta, Ga., have about 100 men and 200 teams grading this "dummy" line between the points mentioned in the title. The work will probably be completed in two months.

Birmingham Mineral.—The Helena & Blockton branch is now in operation between Helena and Blockton, Ala. The track between Gurnee and Blockton, a distance of 10 miles, is used jointly by this road and the Brierfield, Blockton & Birmingham.

Brunswick & St. Simon's Coast Line.—This company has been organized by Morris Michelson, James T. Lambright and R. H. Hirshfield for the purpose of constructing a road from Brunswick to St. Simon's Island, Ga., a distance of about 25 miles.

Buffalo & Geneva.—Contracts will probably be called this month for grading the Geneva & Van Etten-ville Road in New York, between these two points, a distance of 57 miles. Three engineering parties are now finishing the location and profile. On the line between Geneva and Grimesville, N. Y., it is stated that there are being employed about 3,000 men, 300 teams, 6 locomotives, 250 cars and 5 steam shovels. Most of the work on the line has been done during July and August as the weather and other matters prevented much progress being made during May and June. Most of the work that has been done is east of Batavia. West of that place comparatively little has been accomplished. The engineers expect that the grading will be practically finished by next May with the exception of some heavy pieces of work. The abutments have been finished for the bridge at Cheektawauga, which will carry the road over the New York, Lake Erie & Western at Black Creek, near Stafford, and for the structures over the crossings of the New York, Lake Erie & Western in the Genesee Valley; the Northern Central, and in Geneva. Work has been begun for the bridge at the Delaware, Lackawanna & Western crossing.

Burlington & Missouri River.—The tracklaying on the extension northwest from Newcastle, Wyo., has been completed for a distance of about 30 miles to a new station called Merino. Trains will begin running on this section within a few days. There will be three stations between Newcastle and Merino, called Arno, Osage and Jerome.

Calgary & Edmonton.—It is stated that the contractors will soon have over a thousand men at work on the 100 miles of the road from Calgary north to a point on the Red Deer River, near Edmonton, Alberta. About 20 miles have been graded north from Calgary and work is progressing rapidly on the contract of G. H. Streval. A number of contractors are transferring their forces from the Qu'Appelle, Long Lake & Saskatchewan road, which has been nearly completed to Prince Albert.

Carolina, Knoxville & Greenville.—The completed part of this road from Greenville to Marietta, S. C., 14 miles, and the unfinished grade and survey have been purchased by James U. Jackson, of Augusta, William Bailey, of New York, and other directors of the Augusta & West Florida. A new construction company, with a capital stock of $500,000 has been formed by New York, St. Louis and Augusta parties, and it it is stated that they propose to resume work on the line within two months. The project includes a road from Augusta to Knoxville, 280 miles long, but of this only 14 miles were built about two years ago. At that time various counties in South Carolina and Tennessee voted $550,000 in aid of the project. Of this sum $15,000 of the amount voted by Greenville has been paid over. The sums voted by Knox County, $100,000, and Sevier County, $75,000, have become void by expiration of the time within which the road was to be built, but it is stated that the other subscriptions are still good.

Central of Georgia.—It is stated that the contractors will have at least 500 men at work on the extension of the Mobile & Girard next week. The extension is from Troy southwest to Andalusia, Ala. It will not pass through Luverne, the terminus of the Alabama Midland, as expected, but will pass seven miles east of that place.

Chicago & Northwestern.—About 250 men are at work on the extension from Metropolitan west to Crystal Falls, a distance of about 13 miles. The road connects the Menominee River branch with the Felch Mountain branch in the northern peninsular of Michigan. The contract has been let to McArthur Bros. & Co., of St. Paul.

Chicago, St. Paul, Minneapolis & Omaha.—Shepard, Siems & Co., of St. Paul, Minn., have been awarded the contract for the line from Randolph, Neb. The line is an extension in a northwesterly direction, for a distance of 22 miles, of the Randolph Branch, the present terminus of which is Randolph. There are no settlements north of Randolph. The terminus will be near the centre of the east half of Knox County. The line is located and work will begin in a few days, probably this week.

Fairhaven & Southern.—One of the ships which has been carrying the rails for this road from England has arrived at Puget Sound, and the second ship is expected very shortly. The tracklaying is now being pushed on the Northern Division to the connection with the Canadian Pacific.

Fort Wayne & Findlay.—This company has been incorporated in Indiana with a capital stock of $200,000, by W. A. Lynch, of Canton, O., and C. H. Roser, of Findlay, O. The road is to be an extension of the Findlay & Western, formerly called the American Midland, from the Ohio state line to Fort Wayne, Ind., a distance of about 20 miles.

Gadsden & Attalla Union.—Tracklaying has been begun on the line between the furnaces at Gadsden and Attalla, Ala., on the Alabama Great Southern, which parallels the Rome & Decatur. The distance is abut 7½ miles. It will be used principally as a freight line. The grading has been completed for about half the distance. Another line is being built from Gadsden to the Nochalula Falls of Black Creek and Bellview Heights on Lookout Mountain, about 12 miles altogetner. Passenger travel will be the principal traffic on this line. The maximum grade on the line is 237 ft. per mile. The maximum curvature is 40 degrees. These grades and curves are on about four miles of the ascent on Lookout Mountain. It is expected to have the road in operation in November. F. C. Dunn, of Gadsden, Ala., has the contract. R. C. Venable, of Gadsden, is Chief Engineer.

Great Northern.—Shepard, Siems & Co., of St. Paul, who have the contract for the 77 miles on the Seattle & Montana, have also been awarded the contract for 185 miles of the eastern division of the Pacific Coast extension from a point near Fort Assinaboine, Mont., near the summit of the Rocky Mountains. The country is described as a rolling prairie and the roadbed will be about three feet above the level. It is expected that 130 miles of the line will be completed by Nov. 1, 160 miles by Jan. 1, while the remaining 25 up the mountains will require until spring for completion.

Harrisburg Terminal.—About 400 men are reported at work on the section between Bowmansdale, Pa., the terminus of the Harrisburg & Potomac and the Susquehanna River. All the river piers for the bridge across the Susquehanna at Harrisburg have been finished above the water level, but the height of water in the river has delayed this work.

Kansas City, Fort Scott & Memphis.—The road is building a second track from Kansas City to Olathe, Kan., a distance of 21 miles.

Lake Temiscamingue Colonization.—The Quebec newspapers state that a number of the officers and directors of the Canadian Pacific have purchased the charter and rights of way of this road, and propose to complete a portion of the line before January. The road is to be built along the north shore of the Ottawa River from a point opposite Mattawa, Ont., to Fort Temiscamingue, a distance of about 75 miles. A bridge will be built across the Ottawa River at Mattawa to connect with the Canadian Pacific.

Leavenworth & St. Joseph.—McArthur Bros. & Co., of St. Paul, have sublet the contract for the bridging on the 23 miles of this road to Thomas A. Kearns. The grading has been mostly sublet in sections of one mile to a large number of contractors. During the construction of the road the headquarters of the principal contractors will be at St. Joseph. Grading has been begun by a force of about 160 men. The work is fairly heavy and averages about 25,000 cu. yds. per mile. There are 44 timber bridges and two iron bridges, one having a 150-ft. span and the other has a 120-ft. span.

Macon & Atlantic.—In the injunction suit brought in the District Court of Georgia, at Macon, the Macon & Atlantic has been enjoined from building within 10 miles of the surveyed line of this road between Macon and Dublin, except that it may build within the 10 miles at its proposed terminal points. The case will probably be taken to the Supreme Court of the state.

Middletown & Hummelstown.—The Philadelphia & Reading has begun the operation of this road, which has just been completed between Middletown and Hummelstown in Dauphin County, Pa., a distance of about nine miles. The road reaches numerous iron establishments at Middletown.

Midway.—This company has been incorporated in Kansas to build a road less than five miles long through Crawford county from a point on the St. Louis & San Francisco, near Litchfield, easterly to the Missouri state line.

Monterey & Mexican Gulf.—The tracklaying on the southern division south of Linares, Mex., is progressing steadily, and about a mile of track is being laid daily. There has been some delay on account of the non-arrival of construction material. The line will probably be completed to Victoria early in September.

Mount Auburn & Taylorville.—The projectors of this road are desirous of negotiating with construction companies which would undertake the building of the line and they hope to make some arrangement so that construction work may be begun some time this year. They offer the right of way and all township subsidies voted. The road is to extend from Mount Auburn, through Grove City, to Taylorville, in Christian County, Ill., a distance of about 16 miles. John G. Dunon, of Taylorville, is Chief Engineer. J. B. Matthew, of Mount Auburn, is one of the directors.

Nashville, Chattanooga & St. Louis.—Rockwell, Poe & Crutchfield, of Chattanooga, Tenn., have been awarded a contract on the Pikeville extension from Dunlap to Pikeville, Tenn., 22 miles long. Farleigh & Betts, of Pikeville, Tenn., are surveying an extension of the road to Owens Station via Tracy City.

New Orleans, Fort Jackson & Grand Isle.—The tracklaying on this road was to be resumed this week. This work has been suspended since March 1 last when it was stopped by the crevasses and floods. The rails and other material have arrived and are now ready for use. About 27 miles of the road is completed and grading has been finished for about 20 miles further. The line from New Orleans to Fort Jackson will be built first. A survey is being made for the branch to Grand Isle.

Newport & Sherman's Valley.—This company was recently incorporated in Pennsylvania to build a railroad from Newport to New Germantown. It will probably be operated as an extension of the Diamond Valley road. The capital stock is $120,000. David Gring, H H. Bechtel and W. H. Grant, of Newport, are the incorporators.

New Roads.—A survey is being made by John B. Harper, Chief Engineer, for a proposed road from Durango, Col., south to the San Juan River and thence southwesterly to a point on the Atlantic & Pacific. James W. Hanna is one of the projectors.

Arthur W. Dudley, of Brentwood, N. H., is making a survey for a new road which is projected to extend from Portsmouth through Exeter to Epping and Greenland on the Concord & Montreal road. The expense of the survey is borne by the towns through which the roads will pass.

A survey is being made by Beaton Smith, of York, Pa., for a proposed road from Emmettsburg, Md., the northern terminus of the Emmettsburg Railroad, to Gettysburg, Pa., about 10 miles.

A road is proposed from Waco to Thurber, Tex., passing through Stephensville, Walnut and Meridian. These towns have raised sufficient money to complete a survey of the line and this will soon be commenced.

Northern Pacific.—The company is to build a double track from the station in West Superior, Wis., to Duluth, about four miles. This distance includes the long bridge across St. Louis Bay, but the company does not propose to build another track on that structure.

Ohio Valley.—It is stated that the contract has been let for 40 miles of a further extension of this road from Powhatan to Marietta, O. The road is an extension of the Pennsylvania and is at present under construction between Bellaire and Powhatan, a distance of 16 miles. The total distance between Bellaire and Marietta is about 84 miles.

Oregonian.—Surveys are still being made on the west side division for the station grounds to which it is proposed to remove the present buildings. Ballasting is in progress at Sheridan, Or., and other improvements are being made on this division. The east side division is being widened to standard gauge, the bridges and trestles are being strengthened and changes are being made in the buildings for the new standard gauge. The equipment is expected by October. The rails will not be changed until the new rolling stock arrives. The narrow gauge equipment will be used on the west side division, which will probably not be changed. Surveys are still being made between East Portland and Silverton, Or. The grading was also begun, but on account of a change in the location this work has been suspended. The right of way has been secured for the line from Coburg through Springfield to Jasper and grading will soon begin. About 1,100 tons of new rail have been delivered at East Portland from the ships and two other vessels with another thousand tons are expected soon.

Oregon & Washington Territory.—The grading on the Grande Ronde extension has been completed from Union north to Summerville, Ore., a distance of 20 miles. The work has been discontinued for the present. The work on the extension just completed is very light, averaging about 8,000 cub. yds. of earth per mile. The maximum grade is 46.5 per mile and the curvature one degree. The company receives a subsidy of $160,000 if 20 miles of the extension are graded by Aug. 1 and the entire line is put in operation by Dec. 1, 1891. The locating survey has been made from Summerville to Elgin, a distance of nine miles, and a preliminary survey has been made across the Blue Mountains and connecting with the main line at Athena, Or., and Walla-Walla, Wash. The work on the section between Summerville and Elgin will be heavier than on the section just completed, and there will be some rock work. The grades will be lighter, but the maximum curve will be 12 degrees.

Ottawa & Gatineau Valley.—Grading has begun on the third section of this road, which is being built from Ottawa north to Chelsea, Que. The grading is nearly finished on the first 20 miles. Work will soon begin on the foundation for the bridge at La Peche, over the river of the same name.

Pennsylvania.—The company has commenced to straighten its tracks at New Brunswick, N. J., and the roadbed is being widened for the completion of the four-track system in those parts of the city where this work has not yet been finished. A sharp curve extending from George street station to Church street, which has been the scene of many accidents, is to be eliminated by the straightening of the road.

Portland & Puget Sound.—The contractor has established six camps betweeh Portland and Kalama, and has about 400 men at work at present. Two hundred and fifty men are employed on the section at Olympia. The heaviest work is between Kalama, and Martin's Bluff, 5 miles, where heavy cuts and fills must be made. The road will follow the Columbia River, from Vancouver to Kalama, and will then extend north to Olympia and Tacoma.

Port Townsend & Southern.—Over 500 men are working on the extension from the present terminus, 20 miles south of Port Townsend, Wash., to the northern terminus of Hood's Canal. Much of the grading between these points has been finished and for a considerable portion of the distance the track has been laid. Work has been in progress for some time on the southern division from Olympia north and a good deal of the piling has been driven on the west side of the city from the Fourth street bridge to Butler's Cove.

Quebec Central.—It is stated that this company proposes to build a new line from Tring Station, Que., south to a connection with the Canadian Pacific at Lake Megantic, and thence to some point in Maine near Phillips or Franklin. It is expected that the St. Francis branch will be completed as far as St. George in September.

Rio Grande Junction.—This road has been opened for business by the Colorado Midland between Newcastle and DeReque, Colo., a distance of 45 miles from Newcastle and 37 miles west of Rifle Creek, the former terminus. The rails have been distributed on the remaining portion of the line, and a large force is laying track. It is not expected, however, to open the road to Grand Junction before Sept. 15, as there are a number of bridges to be built, and the timber for these has not yet been secured.

Savannah, Americus & Montgomery.—It is expected that the entire road between Americus and Louvale, Ga., will be made standard gauge by Sept. 20. The standard gauge track has been finished to Richland, 27 miles west of Americus, and the work is now in progress on the remaining 22 miles.

Seattle & Montana.—Some of the subcontracts on this line have been let and clearing was commenced Aug. 4. Earle & Donahue have about 200 men and 40 teams employed on a 10-mile section from Richmond Beach, 10 miles north of Seattle. C. H. Wilson has a subcontract near Edmonds, and C. C. Henry one at Ballard.

Seattle & Northern.—This road was put in operation Aug. 5 between Anacortes, on Fidalgo Island, to a point seven miles beyond Sedro, Wash., on the Skagit River. The road has been nearly finished to Hamilton, seven miles further up the river, and 37 miles from the western terminus. Tracklaying will begin on this section about the latter part of this month, when the rails are expected to arrive.

Southern Pacific.—The company has accepted the offer of the subsidy of $315,000 and the rights of way to complete a coast line between Santa Margarita and Ellwood, Cal., thus making a continuous line from San Francisco to Los Angeles. A convention of delegates from the coast counties will be held Aug. 16 to make further arrangements with the company.

The right of way has been secured from Thibodaux, La., the terminus of a short branch, north about six miles, along the La Fourche bayou to a sugar refinery. The right of way will be offered to the company and it is expected that they will agree to build the extension this season.

South Florida.—The company has filed with the secretary of state of Florida notice of intention to build an extension of the road from Pemberton Ferry, its present terminus, northwestwardly through Hernando and Citrus counties, passing at or near Dunnellon, in Marion county, thence northwestwardly through Marion, Levy and Alachua counties to a connection with the Savannah, Florida & Western road, a total distance of about 80 miles.

Spokane Falls & Northern.—It is expected to have the extension from Marcus northward to Little Dales, Wash., on the Columbia River, 27 miles, in operation this week. Connection will be made by boat with the Canadian Pacific, which will be run between Little Dalles and Revelstoke, B. C., about 200 miles.

Tarpon Springs & Tampa.—This company has been incorporated in Florida by Jacob Disston, F. A. Davis, C. E. Sajous, of Philadelphia, Pa.; J. M. Vinson, of Tarpon Springs, and others, for the purpose of constructing a road from the mouth of the Anclote River to Tampa via Tarpon Springs. The capital stock is $100,000.

Union Pacific.—The extension of the Cheyenne & Northern from its present terminus at Wendover has been graded as far as Douglas, Wyo., on the Freemont, Elkhorn & Missouri Valley road, 25 miles. The cross ties are being put down and tracklaying will begin very shortly.

United Railroads of Washington.—This company has been incorporated in Washington with a capital stock of $1,000,000. The new company will be a consolidation of all the subsidiary companies of the Northern

Pacific in Washington. It will include eight lines and the new company will become the trustee of the Northern Pacific and issue consolidated bonds, the Northern Pacific controlling the lines. The company is authorized to construct or consolidate with the following roads under the new state law providing for the consolidation of all railroads operated under one corporate name: A line from North Yakima westerly, by way of Natches River across the Cascade Mountains, near the Cowlitz Pass, through Lewis County, at Chehalis, thence along Willapa River to South Bend, from South Bend on the south side of Gray's Harbor, from South Bend to the Columbia River, opposite Astoria, thence north to Leadbetter Point; down Chehalis Valley to the south side of Gray's Harbor vicinity, South Bay; from the Northern Pacific in Pierce County, to Olympia, thence to and down the Black River to connect with a line down Chehalis Valley; from Montesano up the Wynatchie River, 25 miles; from Gray's Harbor up the Wishke River, 20 miles; from head of Gray's Harbor along north side of harbor to the mouth of the Humptulip River, thence up that river 50 miles, and from Hoquiam northerly, 25 miles.

Washington Coast Railway & Terminal Co.—Incorporated in Washington to build a road from Gray's Harbor to a point on the Columbia River. The capital stock is $3,000,000. The principal office will be at Tacoma, Wash.

Western New York & Pennsylvania.—President C. H. Allen has sailed for Europe for six weeks' absence, and it is stated that the object of his visit is to complete arrangements for the building of the proposed connecting line between Oil City, Pa., and the Newcastle division of the road. The line will be about 46 miles long and it is proposed to issue new first-mortgage bonds on the extension at the rate of about $30,000 per mile.

West Virginia & Pittsburgh.—The grading for the Weston & Elk River division from Weston south to Braxton, W. Va., a distance of 28 miles, is reported completed and tracklaying will soon begin. The bridge at Weston has been finished and the road will probably be in operation some time in September.

Wichita Valley.—The tracklaying has now been finished to a point 10 miles west of Dundee and 38 miles beyond Wichita Falls, Tex. It is expected to complete the road to Seymour, 52 miles, early in September. There has been considerable difficulty in securing the necessary material for building the line, and the work is, therefore, not progressing as fast as it otherwise would.

Winona & Southwestern.—The contract for an extension of 35 miles from end of track across the Minnesota state line to a connection with the Chicago, St. Paul & Kansas City, in Iowa, has been let to J. & C. Mansfield, of Mansfield, S. D. The bridging will be done by W. D. Van Norman, of Minneapolis, and the tracklaying by J. N. McInerney of the same place. The grading is to be complete within 30 days.

Wisconsin Central.—This company has let to S. A. Harrison & Co., of Ashland, Wis., the contract for an extension from Marshfield to Greenwood, a distance of 20 miles. This is part of a proposed cut off to be built from Marshfield to Chippewa Falls. Work on the line north of Greenwood was begun some time ago.

GENERAL RAILROAD NEWS.

Annapolis, Washington & Baltimore.—We were in error in stating last week that the name of this road had been changed to the Annapolis, Baltimore & Washington.

Augusta, Hallowell & Gardner.—This company proposes to issue $100,000 20-year six per cent. bonds on seven and one-half miles of new road in Maine.

Boston & Albany.—A proposition to increase the capital stock of the company $5,000,000 is to be submitted to the shareholders at the annual meeting in September.

Canadian Pacific.—The gross earnings of this company for June, 1890, were $1,356,503; the operating expenses, $823,346, and the net earnings, $533,157. This shows an increase in net earnings of $5,695. The gross earnings for the half year to June 30, were $6,911,820, the operating expenses, $4,791,637, and the net earnings $2,120,182. The increase in net earnings over the first six months of 1889 is $142,760.

Chicago & Atlantic.—This road was sold this week at foreclosure sale at Indianapolis for $5,000,000 to the New York, Lake Erie & Western, the only bidder.

Duluth, South Shore & Atlantic.—This company has filed for record in Wisconsin a mortgage for $20,000,000 in favor of the Central Trust Co., of New York City.

Fitchburg.—The gross earnings of the company for June were $537,948, an increase of $60,782. For the quarter ending June 3, the gross earnings were $1,574,711, an increase of $188,342; net, $430,634, an increase of $147,062; surplus, $113,092, an increase of $147,444.

Manhattan.—A judgment of $60,000 against the Manhattan Elevated has been granted by Judge Andrews, of the Supreme Court in New York, in favor of the American Bank Note Co. The award is for damages to the part of the building in New York City fronting Trinity Place. The damages to the easement are fixed at $40,000, and the loss of light, air, and the destruction of plates is estimated at $20,000.

New York Central & Hudson River.—The gross earnings of the company for July were: 1890, $3,004,827; 1889, $2,951,919, an increase of $52,908. The earnings for June were: 1890, $3,007,097; 1889, $3,111,443, a decrease of $104,346. For the quarter ending June 30 they were: 1890, $9,158,170; 1889, $8,746,667, an increase of $411,503, and for the nine months ending June 30: 1890, $27,263,202; 1889, $25,951,035, an increase of $1,312,167.

An account of the strike will be found on the first page of this issue.

Norfolk & Western.—The following table gives the earnings of this road for the six months to June 30.

Earnings from	1890.	1889.	Inc.
Passeng. mail and express....	$626,700	$486,596	$140,104
Freight.....	2,430,589	2,041,098	389,491
Gross earnings.....	$3,057,289	$2,527,694	$529,595
Expen. and taxes.....	2,035,348	1,646,138	389,210
Net earnings.....	$1,021,941	$881,556	$140,385
P. c. of expen. to gross earn.	67	65	

Northern Pacific.—The company has made an estimate of the earnings of the company for the year ending June 30. An officer says: The gross earnings of the company for the fiscal year just closed were $22,600,000. After paying all fixed charges, rentals, and four per cent. on the preferred stock, there will be a surplus between $800,000 and $1,000,000. Next year we will have fully 10,000,000 bushels of wheat to carry to Tacoma on the west end of the road and about 20,000,000 bushels to Duluth or Chicago on the eastern end of the line. This will provide a tonnage fully 50 per cent. greater than that from grain last year. We are also having a handsome increase in general merchandise and other traffic. I expect the gross earnings of the present year will increase fully $3,000,000 over last year's, and the net earnings will be fully $1,000,000 more than in the year just passed. As an illustration of the improved condition of the affairs of the farmers, I can say that shipments of threshing machines into Dakota and to the west coast aggregate more in number this year than for three previous years. Before winter we will have laid 300 miles of new 67-lb. steel rails and put in 18,000,000 new ties. All this improvement has been made this year. We have added to our equipment 2,500 box cars, 1,500 freight cars of other kinds, and 100 locomotives.

The approximate gross earnings of the company for July, 1890, were $1,987,361, against $1,925,394 in the same month last year, being an increase of $61,967. The mileage in 1890 was 3,613 miles, 161 miles greater than that of the previous year.

Philadelphia, Harrisburg & Pittsburgh.—The Harrisburg Terminal and the Harrisburg & Potomac controlled lines of the Philadelphia & Reading have filed articles of consolidation in Pennsylvania under the above title.

Sault Ste. Marie & Southwestern.—Press dispatches state that the Chicago, St. Paul, Minneapolis & Omaha has agreed to purchase this road for the sum of $900,000. The road extends from Fairchild to Mondovi, Wis., and is 37 miles long.

Syracuse, Ontario & New York.—The issue of $350,000 of new four per cent. bonds was authorized at a meeting of the stockholders last week.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Aug. 13, 1890.

The shippers and the roads continue at loggerheads concerning the uniform bill of lading. The matter will come before the Joint Committee of the Central Traffic and Trunk Line Associations to-morrow and it is probable that some further action may be taken by the associations in regard to the matter. It is understood that the shippers will not request any further representation at this meeting. The Chicago Committee of the Central Traffic Association have issued the following resolution, which was unanimously adopted:

"*Whereas*, It has been the custom at various shipping points west of Chicago where Eastern lines' agents are located to indorse on the initial or Western lines' receipt the through rate from point of origin to destination, and as such action is regarded as in conflict with the agreement relative to the use of the new uniform bill of lading and enables shippers to obtain a bill of lading with through rate and without uniform bill of lading conditions, Therefore, be it *Resolved*, that the Eastern lines immediately instruct their agents (local or line) at all points west of Chicago, where bills of lading are issued, to refuse to endorse through rate on said Western receipts, but shall, if shipper insists on through rate being made, take up the western line's receipt and issue in lieu thereof a new uniform bill of lading."

The rate committees have progressed sufficiently in checking up the new eastbound rates from the Missouri River to warrant their adoption on the 25th inst. and authority has been issued by the Western Freight Association accordingly.

The Chicago & Ohio River Traffic Association has advanced the proportional rate on packing house products from Chicago to the Ohio River crossings (north bank) to 12 cents per 100 lbs. on shipments destined to Green Line and Carolina territory.

The Board of Managers of the Interstate Commerce Railway Association held their regular monthly meeting to-day, but no topics of importance were considered.

The Interstate Commerce Commission.

The Commission on Aug. 7 announced its decision in the case of the San Bernardino Board of Trade against the Atchison, Topeka & Santa Fe and others in favor of the complainant. The complainant alleged that the railroad companies charged more on certain specified commodities from Missouri River points to San Bernardino, Cal., than for the longer distance over the same line to Los Angeles. The opinion was written by Commissioner Morrison, and is in substance as follows:

1. Where a complaint alleges that a greater charge, in the aggregate, for the transportation of a like kind of property is made for a shorter than for a longer distance, over the same line in the same direction, the shorter being included in the longer, and that an unlawful preference is thereby given one locality over another, it is held that complaint is sufficient to put the carriers on proof that the services were rendered under such dissimilar circumstances as to justify the greater charge.

2. The water competition which will justify a greater charge for a shorter distance by railroads must be actual. Possible competition will not justify such greater charge under the provisions of the fourth section of the act to regulate commerce. The Commission, as required by the statutes, raises no presumption as to the legality of such rates, and no omission or failure to challenge or disapprove the schedules of rates so filed can have the effect of making rates lawful which are unreasonable.

Traffic Notes.

The New Orleans Car Service Association has been organized, and will go into effect Sept. 1. The manager is Mr. E. S. Hoskins, late of the Illinois Central.

The Buffalo Weighing and Inspection Bureau handled 1,300 tons of freight in July, which the shippers had billed at only about 1,000 tons. The amount gained was $865, and the expenses of the bureau were $590.

A consignee has begun a suit to test the legality of car service charges at Louisville, and has secured a mandatory injunction compelling the Louisville & Nashville to receive and deliver its freight until the dispute has been adjudicated.

General Freight Agent Stewart, of the Pennsylvania Co., has asked Chairman Blanchard to have the recent irregularities in the billing of coke over his line fully investigated, denying on behalf of the officers of the road all knowledge of any manipulation of rates.

The New York, Ontario & Western, to promote its summer travel, has announced that it will carry free material for building boarding houses and hotels in the counties of Delaware, Ulster, Orange and Sullivan, in the State of New York, provided the buildings have a capacity for 100 or more persons.

Rates for Commuters' Baggage.

As most of our readers know, the Pennsylvania Railroad has had in force for two years or more, at Philadelphia, a special tariff for the transportation of commuters' merchandise. This system has worked so satisfactorily to both the railroad and its patrons that it has been inaugurated at Baltimore also, from which place we have recently heard emphatic praise of the system from the newspapers. While this method of dealing with a somewhat difficult problem is not new, its details will be found of interest to passenger traffic men and others, and we reprint below the salient portions of the circular issued by the General Baggage Agent of the Northern Central and the Baltimore & Potomac roads when the system was established at Baltimore.

NOTICE TO BAGGAGE AGENTS AND BAGGAGE MASTERS.

. . . The transportation of articles in baggage cars between Baltimore, Parkton, and intermediate points, and between Baltimore and Catonsville in either direction, will be subject to the following charges and regulations:

Baskets containing 60 lbs. or less of marketing, consisting of meat, vegetables, groceries, butter, bread, etc., also butter in kettles or tubs, when intended for family use, will be carried free for holders of commutation tickets and other regular patrons. Empty baskets, butter kettles or tubs and milk and ice cream cans will be returned free of charge.

Packages weighing less than 30 lbs., when accompanied by the holder of a ticket, will also be carried free.

Marketing or packages in excess of the prescribed free limit, and wash hampers, will be charged for as follows:

	Cents.
Under 10 lbs. excess.....	5
10 lbs. to 25 lbs. excess	10
Over 25 lbs. to 50 lbs. excess.....	15
Wash hampers, for 25 lbs. or less.....	10
" for over 25 lbs.....	15

Hotel, boarding-house, and caterers' supplies (with the exception of ice cream in cans), not exceeding 100 lbs. for each shipment, will be carried free.

Ice cream in cans will be charged 15 cents per 100 lbs. or fraction thereof.

Holders of commutation tickets, and other regular patrons, may have packages forwarded by the first train, when desired, and without accompanying them, at the following rates:

		Cents.
For each article weighing.	Under 10 lbs.	5
	10 lbs to 25 lbs	10
	Over 25 to 50 lbs.....	15

With the exception of marketing and ice cream, and wash hampers, single articles weighing over 50 lbs. will not be forwarded, but must be shipped by express or freight.

Package stamps of the above denominations, in sheet form, are sold at all regular ticket stations within the territory named. Stamps of the denomination of five cents, in book form, are sold at the principal points. The train and station baggagemen make and deliver waybills, sign receipts, etc., in the same general way that express messengers do.

Reduction of Kansas Freight Rates by the Commissioners.

The Board of Railroad Commissioners on Aug. 9 rendered a decision ordering all railroads in Kansas to reduce the rates upon the local distance tariff and adopt on Sept. 1 a new schedule prepared by the board, which makes an average reduction throughout the state of 32 per cent. on wheat, flour, corn, oats, etc., and 10 per cent. on merchandise, cattle, coal, lumber, salt, etc. This order is made by the board against a vigorous protest of all the railroads. The commissioners say:

"It is true that there was no complaint or petition before us asking that this be done, but our views upon this subject had been before freely expressed to traffic managers connected with the Kansas roads. Within the past year a number of reductions have been made from this distance tariff upon complaints located in various parts of the state, and a general revision has been deferred in consequence of the financial stress to which railroad companies have been subjected by the addition, within the short period of five years, of something over 100 per cent. to the then existing mileage, and for the further reason that no general complaint of the rates upon that tariff was made to this office."

Court Decision on Party Rates.

By a decision of Judges Jackson and Sage, of the United States Court, at Cincinnati, on Monday last, the Interstate Commerce Commission's case against the Baltimore & Ohio concerning party rates is dismissed. It is held that party rates are just and proper, and subject alone to the provisos that rates must be just and reasonable and that no unjust discrimination be made against persons or traffic similarly circumstanced.

The Interstate Commerce act leaves common carriers free to make such contracts as are for their interests and to classify and scale their charges as to them seems best.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Aug. 9, amounted to 58,945 tons, against 56,921 tons during the preceding week, an increase of 2,024 tons, and against 53,524 tons during the corresponding week of 1889, an increase of 5,421 tons. The proportions carried by each road were:

	W'k to Aug. 9.		W'k to Aug. 2.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	7,658	13.0	9,323	16.4
Wabash.....	3,642	6.2	3,547	6.2
Lake Shore & Michigan South.	10,720	18.2	12,296	21.6
Pitts., Ft. Wayne & Chicago...	8,111	13.7	6,060	10.6
Chicago, St. Louis & Pitts.....	6,751	11.5	6,416	11.3
Baltimore & Ohio.....	3,660	6.2	3,433	6.0
Chicago & Grand Trunk.....	6,845	11.6	5,577	9.8
New York, Chic. & St. Louis...	5,958	10.1	4,758	8.4
Chicago & Atlantic.....	5,600	9.5	5,511	9.7
Total.....	58,945	100.0	56,921	100 0

Of the above shipments 2,336 tons were flour, 22,926 tons grain, 1,334 tons millstuffs, 6,607 tons cured meats, 2,801 tons lard, 8,501 tons dressed beef, 1,715 tons butter, 1,790 tons hides, 908 tons wool, and 6,250 tons lumber. The three Vanderbilt lines carried 41.3 per cent., and the two Pennsylvania lines 25.2 per cent.